TECHNOLOGY DEPARTMENT

The Chemical Age

VOL LXI 13 AUGUST 1949 No 1570

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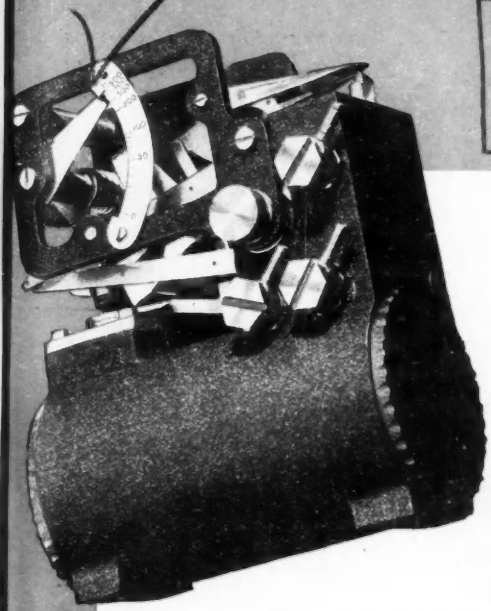

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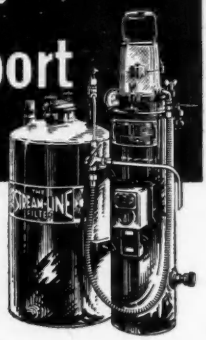

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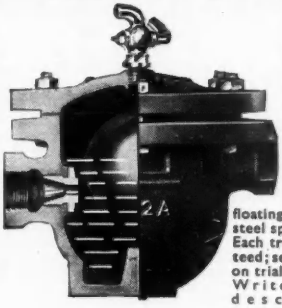

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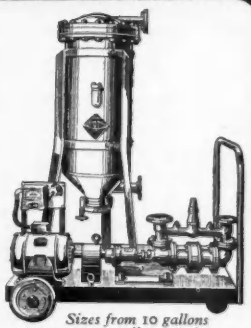

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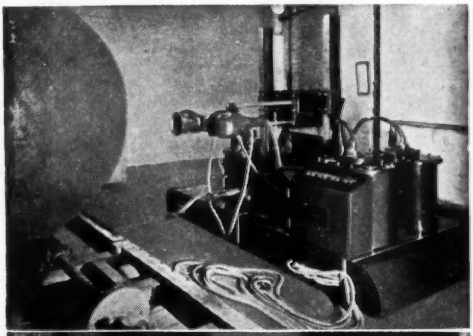

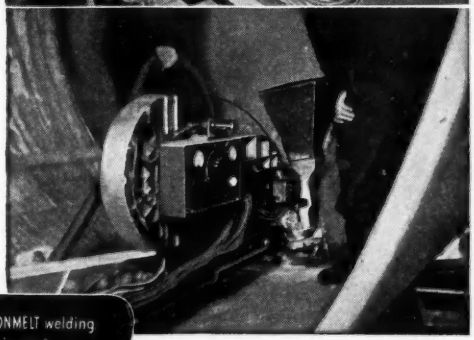

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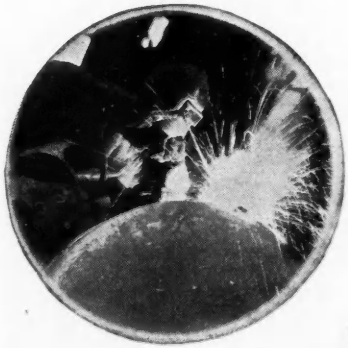

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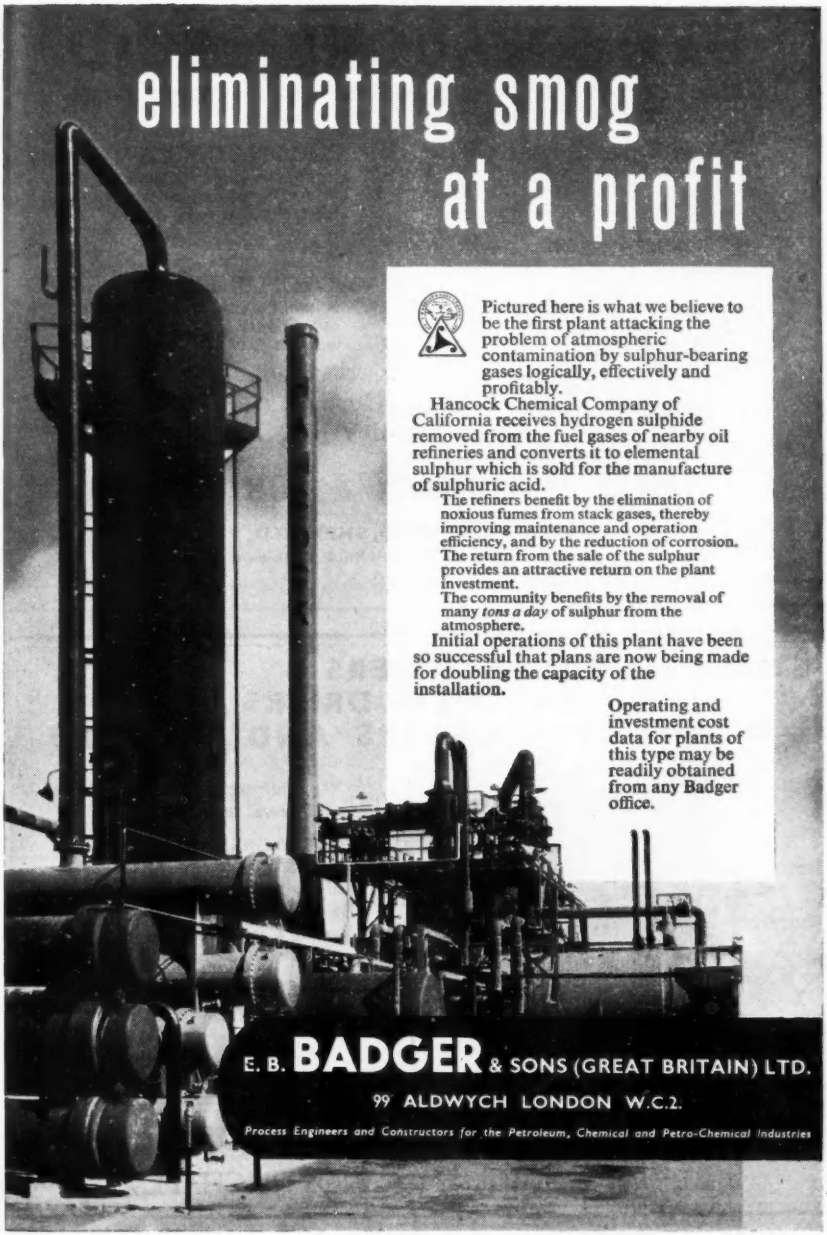
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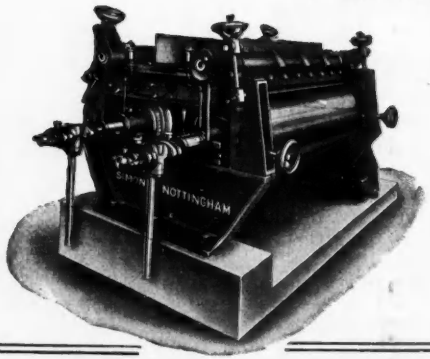

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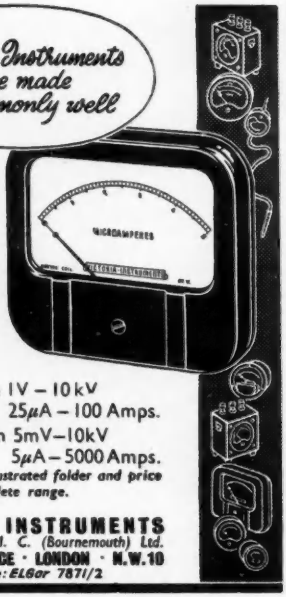

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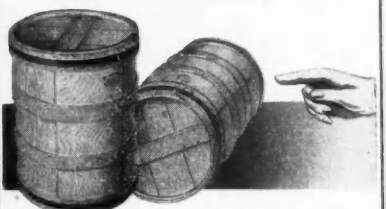

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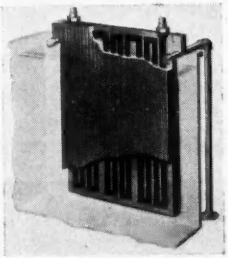

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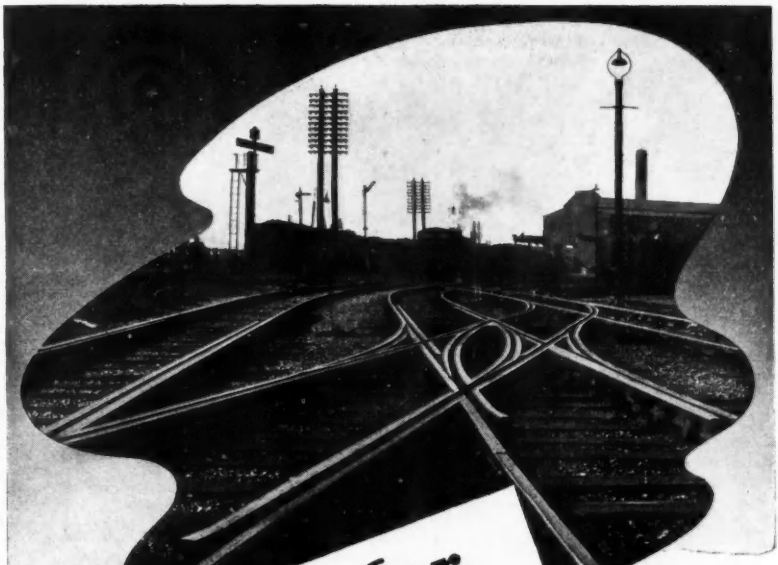

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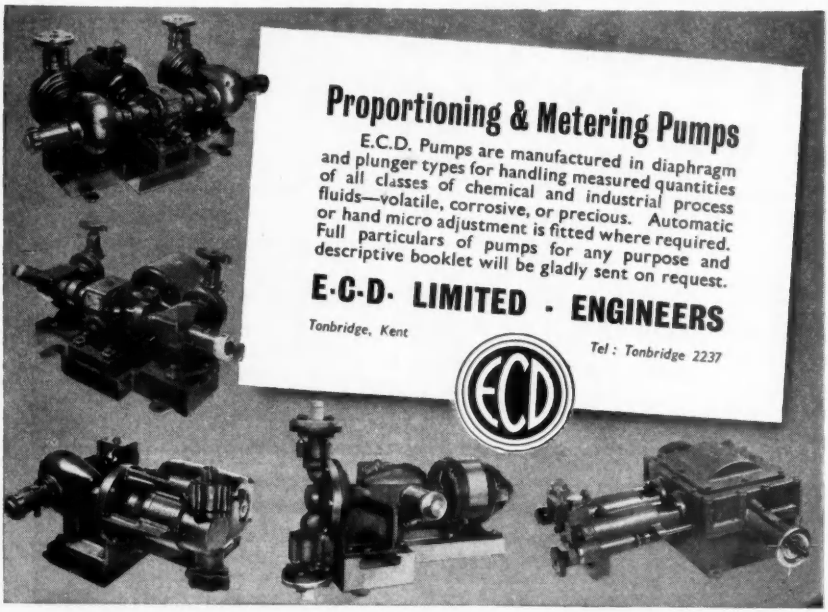
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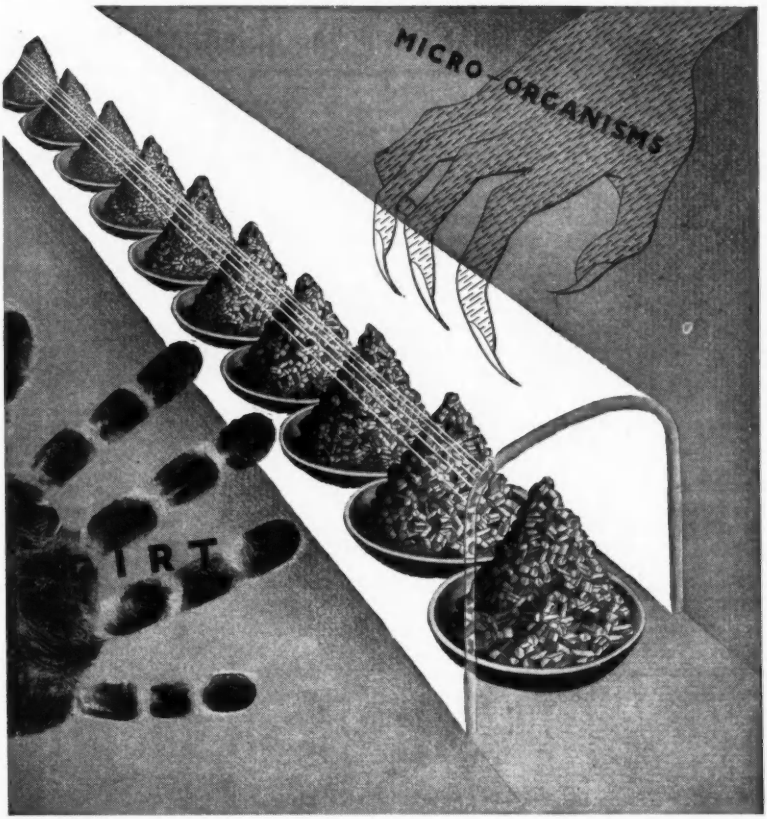

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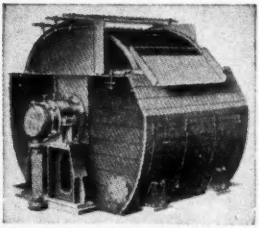

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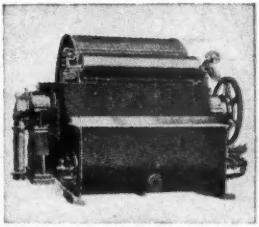

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The
Chemical Age

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New Fields for Science

ONE of the factors contributing significantly to the prevailing shortage of scientific workers has been the constantly increased demand for their services in British countries overseas. The sciences have played a decisive part in the development of these territories since the pioneer era, but their field has until recently been a limited one. Their aid was needed above all else for the promotion of health services to make many vast and relatively little developed areas fit for men to live and work in. That honourable service continues on a wider scale than ever before and promises to be indispensable as long as any contemporary estimate can foresee. Yet it has already so improved the prospects of profitable development of some areas of the earth as to change entirely the needs of those places from "bush equipment" to the kind of scientific and technological services employed in highly developed agricultural and industrial communities.

Nothing could be more encouraging, from the viewpoint of the young science worker or technologist in training now, than the multiplying evidences that there will be awaiting him work on a scale larger than ever before as soon as he is fully qualified to undertake it. The attractiveness of the prospect is thrown into sharper focus by the knowledge that his is a "sellers' market." He is wanted here, while around the earth are opening up fields in which his skill and knowledge may be indispensable if great schemes now being shaped in Africa and elsewhere are to come to fruition. A glimpse of this situation is afforded in the current second annual report of the Colonial Insecticides Committee, of the Colonial Research Council which, incidentally, is in the present context concerned chiefly with Africa, and consequently does not pretend to tell the whole story. "There is a grave shortage of trained scientific personnel for employment in insecticide research in the Colonies," reports this committee. "The committee has recommended that to meet the situation the award should be made of six studentships to young graduates, for training in insecticides research in the United Kingdom, preparatory to taking up employment with the insecticide teams in the Colonies." With the same object in view, the two Beit scholarships to be offered shortly to Southern Rhodesians will be integrated with the work of the Colonial Insecticides Research Unit in East Africa.

Measures such as these, however, touch only the fringe of the needs, of which this report provides some reflections. How urgent they are

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becomes evident in the light of the fact that it has been found necessary to enlist the help of American research workers to grapple with some of the pest control work which is calling for immediate action in Africa. The ECA has approved that proposal and will pay out of ERP funds part of the cost of maintaining the U.S. scientists while they collaborate with British workers already devoted to the task of limiting the destruction wrought by trypanosomiasis, malaria and insect-borne diseases in Africa. That there is no lack of cordiality and readiness to collaborate with the Insecticides Committee is manifest in this and other directions, but from none is there any prospect of providing science workers in anything like the number the scope of the work in the insect war alone will require. The conquest of the mosquito or tsetse fly with chemical weapons is not achieved by workers in the marsh or scrublands alone. The size of the contribution which is to come from the laboratory workers was attested most convincingly when the first facts about Antrycide were made public. The Insecticides Committee is, of course, very well aware of this need and has drawn attention to the grave lack of fundamental data to ensure the proper use on the new widened scale of insecticides in the public health, agricultural and veterinary fields. To provide more knowledge on which the field entomologist can base his experiments the committee has now set up—not without difficulties and delays—a research station at Porton, near Salisbury, devoted to Colonial problems, to study such factors as the effect of crystal and particle size upon toxicity.

All these enterprises call for manpower on a scale which existing training facilities certainly cannot fully supply, but the relatively small army in the field has powerful allies and well wishers. The makers of insecticides continue their indispensable work in fundamental and practical spheres and the South African Air Force has made possible much useful experimentation in Swaziland in the aerial dispersion of insecticidal smokes. In that field of activities, it is interesting to note, the Swaziland Government, after purchasing from Imperial Chemical Industries, Ltd., 12,000 ground smoke generators to

(*continued on page 210*)

Notes and Comments

The New Industries

THE difficulties associated with the setting up of new industries, contrasted with the more familiar practice of expanding an existing technique into new fields have evidently been experienced in many stages of the younger enterprises based on petroleum. While many of the synthesis products of petroleum are now coming to the user industries in commercial quantities from the installations in the North-West, the field awaiting development when plant and refinery capacities permit is a great deal larger than that which the petroleum conversion specialists can now call their own. Such news as there has been about the new carbon black enterprises at Avonmouth and Merseyside does not encourage expectations that they will greatly outpace their predecessors in the petroleum field in the rate of their development, although their technical problems are somewhat less complex. Present indications are that our dependence upon the U.S.A. will not be relieved by home supplies of carbon black before another 12 months have elapsed.

By-Product Heat

WHILE few facts are to be had at this stage, there is some gratification to be derived from the knowledge that the British carbon black plants will be technically as advanced as any, and substantially more efficient than some set up in the U.S.A. when oilfield gases were regarded of little value and often were burned to waste. It is worth noting, for example, that the Avonmouth plant on which Philblack, Ltd., is now working will be practically 100 per cent efficient, so far as carbon black yield is concerned. In some American plants recovery of 16 per cent of carbon content of the hydrocarbons used to be regarded as adequate. The conspicuous problem in any such carbon recovery plant here is likely to be to make the most profitable use of the heat generated. In the older plants based on the incomplete combustion of hydrocarbon gases in air temperatures of around 2000°F were usual. It can be assumed that thermal values in the new British plants will be approximately of the same order, so that their economical uses, in addition to preheating the oil gases, must present stimulating scope for enterprise by commercial engineers.

Liaison with Industry

EDINBURGH University, foremost in its appreciation of universities' power and responsibility to promote progress in industry, has found a vice-chancellor better qualified than any to give practical expression to its philosophy in Sir Edward Appleton, former secretary of the DSIR. This emerges very clearly in the foreword he has written for the publication issued by the university's Industrial Liaison Committee to explain to industrialists the creed of interdependence of the fundamental and the practical. He says that the history of science is full of examples of the surprising way in which fundamental research has yielded results of importance to technology and industry. Practical developments equally were capable of affording new tools and techniques to the fundamental research worker. The old distinction and antagonism between pure and applied science was never justifiable and now was fast disappearing. "I do not feel that a university can achieve its whole purpose if its members are content to live a cloistered life of detachment, impervious to what is happening in the world outside," he declares. "In this volume, we university workers in departments most closely associated with industrial interests try to describe ourselves—who we are and what we are trying to do." Twenty departments are introduced and depicted with a refreshing absence of formality.

International Exchanges

THE interdependence of chemists, irrespective of the conflicts of national objectives and philosophies, and their need to collaborate will be acknowledged again in Amsterdam next month, when workers from all the countries in which some degree of freedom is possible in scientific affairs will hold the XVth Conference of the International Union of Chemistry. How chequered has been the course of international collaboration is recalled by Prof. Marston T. Bogert in the course of the Charles Frederick Chandler Lectures given earlier this year at the Columbia University, New York (*Chemical and Engineering News*, 1949, *28*, 1992-95). Prof. Bogert, whom chemists here had the privilege of meeting when he presided over the XIVth congress of the International Union in London in 1947, has rendered further important service to international collaboration by recalling the various stages in the long struggle by chemists to set up and preserve their ideal of identity of objectives. The story, which Prof. Bogert has invested with life again, is shown by him to have begun, in this particular context, towards the end of 1859, with the initiative of Kerkulé, which resulted in the gathering in Karlsruhe during September 5-9, 1860, of one of the most distinguished assemblies of international chemists. Its original purpose was to clear up the extreme confusion in chemical symbolism then in use which, Prof. Bogert recalls, encouraged chemists to represent even water either as HO, H_2O or H_2O_2. How much more it did is revealed in one passage written later by Mendeléev: "The decisive moment in the development of my idea concerning the periodic law I consider to be the year 1860, and the congress of chemists in Karlsruhe in which I took part, particularly the ideas presented during that meeting by the Italian chemist Stanislao Cannizzaro."

The British Press in Turkey

ANY country's prestige and understanding overseas cannot fail to depend to a large extent upon the quality and number of its journals, reviews and magazines, whether they are technical, literary, fictional, artistic, or statistical. It is therefore anything but good news to learn from the monthly trade journal of the British Chamber of Commerce of Turkey (July) that although there exists in Turkey a very lively willingness to know more about Great Britain, English periodicals have tended to disappear from the kiosks and bookshops in Istanbul, driven out by American publications. Several considerations have caused this—the higher cost of production in England and the refusal of English publishers to accept the return of unsold copies and the abundance of reading matter U.S. journals, unacquainted with paper shortage, are able to offer. This decline of English periodicals abroad has another serious aspect, for it can only have an adverse affect on our trade. It is interesting that one journal, which publishes a supplement every other month in the language of the country, has held its own in the Turkish market. This is *Britanya Sanayii*, published by our contemporary THE BRITISH TRADE JOURNAL. We take a justifiable pride in the fact that THE CHEMICAL AGE, too, has managed to increase the number of its subscribers each year since 1946.

NEW FIELDS FOR SCIENCE
(*continued from page* 208)

kill tsetse fly, was presented with a further 12,000 free of charge. That appears to be typical of the cordial relationship between the official agencies and commercial undertakings which are together finding new chemical formulations and new uses to free many parts of the Commonwealth from the pests which have for generations forbidden their full use for agriculture, mining and industry. The successful conclusion of that campaign in any area (in Cyprus the Anophelene mosquito has already been eradicated) is likely to be the starting point of another, infinitely wider in its objectives for development, in which scientists and technologists will have to play no less intimate a part.

GLAXO INCREASES SCOPE IN ITALY

New Model Plant in Verona

The pleasing front elevation of the new building in Verona

A BRITISH enterprise, Glaxo Laboratories, Ltd., now possesses what is considered to be the most advanced plant for the production of pharmaceutical chemicals in Italy. This position was established by the opening at Verona on July 30 of the entirely reconstructed plant of S.A.I. Laboratori Glaxo, the Italian subsidiary which had its inception in 1929.

The ceremony, forming part of the Verona Medical Congress, which concluded on July 31, was distinguished by the attendance of 500 Italian doctors and the British Consul General in Milan (Mr. R. C. Goldie). Earlier, the plant was visited by Sir Alexander Fleming and Prof. Mario Cotellessa, Italian High Commisioner for Hygiene and Public Health.

The new premises consist of a modern four-storey L-shaped building with a frontage of 174 ft. and a depth of 115 ft. The new plant has been built around the old which now becomes a small and unrecognisable part of the production area. The exterior of the factory is in smooth red bricks with a plinth of rough worked grey-pink stone. On the first floor, immediately above an archway which symmetrically divides the frontage, are the board room and factory offices, and on the second are the library and conference room.

The most advanced section of the factory itself, which shares the frontage with the office suite and occupies a further wing running at right angles into the courtyard, is the ampoule department. Ampoule washing, cutting and filling, as well as the preparation of sterile solutions, is carried out in large well-lighted, air-conditioned rooms, with gas, compressed air, vacuum and nitrogen piped to the benches and machines. The air conditioning system is of a very advanced kind.

The Minadex plant possesses several modern features. Occupying three floors, it comprises all-stainless components connected with resistance glass pipes. Raw materials ascend to the required level, and intermediate solutions and the finished products descend by gravity. The staff of the new factory comprises several hundred.

EFFECTIVE PEST REPELLANT

A NEW chemical treatment, employing pyrethrins or a mixture of pyrethrins and piperonyl butoxide, which is claimed successfully to keep insects from penetrating cotton bags containing stored flour, has been discovered by two U.S. Government scientists, Drs. Richard T. Cotton, of the Bureau of Entomology and Plant Quarantine, Manhattan, Kansas, and Winston B. Strickland, of the Southern Regional Research Laboratory in New Orleans, Louisiana. Laboratory tests are reported to have shown that the common flour insects, in seven months, penetrated none of the treated bags, while one untreated bag admitted 563 of the insects.

Baking tests have indicated that the quality of flour stored in bags so treated is not affected.

In experiments to determine the effectiveness of the chemicals in different concentrations, the scientists found that 10 mg. of pyrethrins, alone or mixed with 100 mg. of piperonyl butoxide, per sq. ft. of cloth gave protection from such insects as flour beetles, the cadelle, Mediterranean flour moth, lesser grain borer, and others which are able to penetrate or to deposit their eggs through the fabrics of untreated bags. Protection was also obtained when bags were made of cloth woven from treated warp yarns and untreated filling yarns.

Sulphuric Acid Statistics

Small Use and Output in the Second Quarter

A SLIGHT fairly general decrease in production and consumption of sulphuric acid and oleum in the second quarter of this year is shown in the classified summary issued by the National Sulphuric Acid Association, Ltd. The comparison is with the January to March quarter.

Comparative figures, with the first quarter totals shown in brackets, are:— Production 427,229 tons, representing 94.0 per cent of total capacity (442,651 tons = 94.5 per cent). Consumption: dyestuffs and intermediates, 17,046 tons (19,906); hydrochloric acid 15,775 tons (16,007); iron pickling, including tin plate, 22,505 tons (23,853); rayon and transparent paper, 39,401 tons (44,718); sulphate of ammonia, 62,386 tons (65,251); superphosphates, 130,329 tons (142,709). Of the few consumption items which showed an increase on the quarter, the principal are: Mineral oil refining 14,476 tons (11,943), and paint and lithopone 27,406 tons (23,644).

SULPHURIC ACID AND OLEUM
Tons of 100% H_2SO_4

	Chamber only	Contact only	Chamber and Contact
Stock, April 1, 1949	30,754	23,051	53,805
Production ...	197,317	229,912	427,229
Receipts	44,252	12,398	56,650
Oleum feed ...	—	2,397	2,397
Adjustments ...	−66	+126	+60
Use	125,058	81,162	206,220
Despatches ...	113,613	157,887	271,500
Stock June 30, 1949	33,586	28,835	62,421
Total capacity represented ...	213,130	241,560	454,690
Percentage production	92.6%	95.2%	94.0%

RAW MATERAILS
Tons

	Pyrites*	Spent Oxide	Sulphur and H_2S	Zinc Concentrates
Stock, April 1, 1949	74,473	169,171	60,228	15,220
Receipts	90,506	55,110	90,059	32,664
Adjustments ...	−384	+1,128	−382	+80
Use	89,260	48,621	74,220	36,714
Despatches ...	2	4,649	79	—
	23†	108†		
Stock, June 30, 1949	75,310	172,031	75,606	11,250

* "Receipts" and "Use" include anhydrite "converted" to pyrites.

† Used at works for purposes other than sulphuric acid manufacture.

CONSUMPTION OF SULPHURIC ACID AND OLEUM
UNITED KINGDOM AND EIRE

	Tons 100% H_2SO_4
Accumulators	2,197
Agricultural purposes	1,736
Bichromate and chromic acid	2,909
Borax and boracic acid (" Unclassified ") ...	
Bromine	2,941
Chlorsulphonic acid (" Unclassified ")	
Clays (Fuller's earth, etc.)	2,048
Copper pickling	666
Dealers	4,267
Drugs and fine chemicals	2,552
Dyestuffs and intermediates	17,046
Explosives	2,884
Export	804
Formic acid (" Unclassified ")	
Glue, gelatine and size	536
Hydrochloric acid	15,795
Hydrofluoric acid (" Unclassified "	
Iron pickling (incl. tin plate)	22,505
Leather	1,536
Metal extraction	556
Oil (mineral), refining	14,476
Oil (vegetable), refining	2,601
Oxalic, tartaric and citric acids (" Unclassified ")	
Paint and lithopone	27,406
Paper, etc.	1,089
Phosphates (industrial)	1,314
Plastics, not otherwise classified	3,919
Rare earths (" Unclassified ")	
Rayon and Transparent Paper	39,401
Sewage	2,744
Soap and glycerine	1,524
Sugar refining	163
Sulphate of alumina (" Unclassified ") ...	
Sulphate of ammonia	62,386
Sulphate of barium	1,287
Sulphate of copper	5,313
Sulphate of magnesium	1,478
Sulphate of zinc	805
Superphosphates	130,329
Tar and benzol	4,383
Textiles Uses	5,872
Unclassified—Uses known	23,598
Uses unknown	11,010
Total	422,076

Fertilisers in U.S.A.

THE prospects for material supplies during the coming fertiliser year were reviewed by Mr. Ray King, chairman of the board of directors of the U.S. National Fertiliser Association, at its recent 24th annual convention. He estimated that, due to increased production capacities and changes in nitrogen-allocation programme, fully 220,000 tons of additional nitrogen will be available for use in the 1949-50 crop-planting year, an increase of 22 per cent over the year before. The amount exported will probably be lower because of discontinuance of the FAO allocation programme and of army exports to Europe.

JULY STEEL OUTPUT

Possibility of Overproduction Foreseen

DESPITE the normal reduction due to holidays in the industry, production of steel in July reached an annual rate of 12.695 million tons, compared with a yearly rate of 12.084 million tons in July, 1948.

So far the output of steel for the seven months to the end of July has exceeded by 431,000 tons the previous record levels attained last year.

Even when allowance is made for the seasonal reduction in production in July and August, states the Iron and Steel Federation, there is good reason to believe that the estimated output of 15½-15½ million tons made in the Economic Survey will be reached.

Pig iron produced during the month was at the rate of 9,224,000 tons—an increase of 316,000 tons compared with July, 1948. A short analysis of iron and steel output since the beginning of the year is as follows:—

STEEL INGOTS AND CASTINGS
(000's of tons)

	1949		1948	
	Weekly average	Annual rate	Weekly average	Annual rate
First quarter ...	305	15,850	287	14,933
Second quarter ...	307	15,944	295	15,325
July	244	12,695	232	12,084

PIG IRON

	1949		1948	
	Weekly average	Annual rate	Weekly average	Annual rate
First quarter ...	179	9,324	175	9,084
Second quarter ...	184	9,559	182	9,464
July	177	9,224	171	8,908

Doubts as to the advisability of continuing schemes for further expansion of the industry were expressed last week by Sheffield steelmakers.

A falling-off in demand has already been experienced, and a first-hand study of the steel position in this country, Canada, and the U.S.A., has caused leaders of the industry to believe that, in view of uncertainty of the market, there is now a real danger of over-production.

Sheffield's Master Cutler, Lt.-Col. J. P. Hunt, is reported by *The Times* to have stated that caution is necessary as German steel products are now coming to England and that Japan will soon be reappearing as a steel producer.

Indications that this view is not unanimously held are shown by the announcement by Dorman Long that the second stage of its development scheme is to be put in hand immediately.

£8 m. STEEL PLAN

Development by Dorman Long

THE second stage of the development scheme of Dorman Long & Co., Ltd., is to be put in hand immediately, involving a further capital expenditure of £8 million. It will include the building of an open hearth steel plant at Lackenby, with a capacity of 10,000 tons of ingots per week, extension of the new ore grading plant at the Cleveland works and new blast furnace ancillary equipment.

Three Years to Complete

The Lackenby plant will feed the new universal beam mill, which is the third stage of the company's plan. Output of the new blast furnaces scheduled for installation at the Cleveland works is estimated at 7,250-7,500 tons of basic iron per week. It is anticipated that all this work can be completed by September, 1952.

The first stage of the company's development programme was the installation of central ore unloading equipment and ore preparation plant at the Cleveland works, and a private railway line over three miles in length linking the Cleveland and Redcar works. Those undertakings, costing about £2.25 million, are complete.

The design of the ore preparation plant made provision for extending its capacity. It has now been decided to undertake this extension and so increase the tonnage of prepared ores, making supplies available to more blast furnaces.

The major development plan includes new blast furnaces at the Cleveland works, and the installation of ancillary blast furnace equipment at these works will fit into the blast furnace building programme, and, meanwhile, will further assist in reducing the cost of iron manufacture at the existing furnaces.

Part of National Scheme

Simultaneously with the carrying out of the first stage of the development plan, extensive preparation of the site of the Lackenby works, covering 650 acres, has been virtually completed. It is now possible to start actual construction of the new open-hearth steel plant.

Approximately 60 per cent of the work will be undertaken by the engineering departments of the company and by its subsidiaries.

The construction work now to begin is part of the National Development plan for the steel industry approved by the Government and promotes greater concentration of N.-E. Coast steel construction.

NEW ALLOY STEEL

Serviceable at Sub-zero Temperatures

THE development of a new alloy steel capable of fulfilling exceptional engineering requirements at operating temperatures as low as −423° F., has been disclosed by the Lebanon Steel Foundry, Lebanon, Pa., U.S.A. The new development is said to open the way to wide application in the chemical, oil, and other fields.

An austenitic cast ferrous alloy containing 19.50 per cent chromium and 9 per cent nickel, among other alloying constituents, the new alloy promises to have particularly useful applications in meeting the requirements of the chemical and some other processing industries. It has already been used effectively in the production of steel castings for pressure equipment in storage facilities for liquid oxygen used as a propellant for rocket engines. Such storage is maintained under high pressures at temperatures of approximately −298° F. In prospect are other applications in various restricted ordnance fields.

Unimpaired at −423°F

The company reports that the new cast steel has shown no structural changes down to −423°F. in hundreds of testing laboratory impact tests from production lots of (L)-22 castings, and the same cumulative tests have indicated appreciable increase in hardness directly proportional to the decrease in temperatures.

An added factor of engineering importance to designers and development engineers is seen in the fact that tensile strength of the particular cast austenitic alloy varies inversely with temperature, and in direct relationship with hardness. Ductility is lowered somewhat, however, but not in proportion to the increase in tensile strength, which is estimated to be approximately 200,000 p.s.i. at −423°, with retention of adequate strength factors and resistance to embrittlement.

The alloy may be welded by either gas or electric processes without the need for subsequent heat treatment, since low temperatures do not necessarily impair the as-welded impact resistance. "No embrittlement from low temperature has been noted in the cast alloy or from welds or adjacent fusion zones made from the same composition, nor has any transition zone been noted in test work covering hundreds of production heats," reports Mr. W. H. Worrilow, president of the Lebanon Steel Foundry.

I.C.I.'s £40 M. EXPANSION

Chairman on "Faith in Britain"

"WITH regard to the threatened nationalisation of our industry, the board will continue its present policy, which in its opinion is best suited for the country, for the workers, the customers and the shareholders," declared Lord McGowan, chairman of Imperial Chemical Industries, Ltd., when he addressed members of the staff of the I.C.I. Dyestuffs Division factory at Grangemouth, Stirlingshire, following his visit to the works recently.

Lord McGowan disclosed that £40 million was being sunk in expanding works in this country, which showed that I.C.I. had faith in Britain and in the world. The slight recession in business which was apparent to-day could not, so far as he could see, go far. Buyer resistance was slackening and he thought they could look forward to stabilisation of the trade position in the not too distant future.

During 1948 the company had shown some wonderful results; their profits were not made by overcharging customers but by greater efficiency in every part of the organisation. Lord McGowan sketched in brief the world picture he had obtained on his recent travels. He saw South America becoming an even greater market for British manufactured goods. Their company's products looked like being in even greater demand in South Africa with the discovery and development of new gold fields. In Tanganyika the ground nuts scheme would require pharmaceuticals, pesticides and fertilisers.

Better Dyestuffs Prospect

In China they had no factory, nor would have until conditions improved, but the people on the spot considered that even the communist regime had to realise that commerce was essential to the country and that trade would be resumed in due course. Even in the U.S.A., the home of mass production, there were still outlets for the company's commodities. At home the textile people were clearing their stocks and could be expected to begin buying the company's dyestuffs again in the near future.

He paid tribute to the management and workers of I.C.I., and to the trade union leaders connected with the company, on the marvellous record in human relations. At one time during the war 130,000 people were employed in this country by the company and not one day had been lost due to a labour dispute.

PETROLEUM CHEMICALS IN GERMANY

New Suggestions for Conversion of Plant on Dismantling List

WHILE dismantling of Fischer-Tropsch synthesis plants is continuing despite protests from interested and official German quarters, plans are being prepared for an extension of oil refining capacity and the production of petroleum chemicals in Germany from imported raw materials. A chemical plant with a throughput capacity of 50,000 tons of oil distillates is to be erected in the Bremen port area. Fr. Stapelfeldt, formerly director-general of the Deschimag Shipbuilding Company (now AG Wesser) is visiting the U.S.A. to study modern American methods in the field of petroleum chemicals, and work on the plant which will concentrate on the production of solvents and materials for the plastics industry is to start before the end of this year.

Shortage of refining capacity forced oil producers in the Emsland fields, which have greatly increased their output this year, to curtail operations, but large tonnages are now to be sent from the Emsland fields to the Shell refinery at Wesseling near Cologne, and Wintershall AG is increasing the capacity of its oil refinery at Salzbergen to 60,000 tons a year. Part of the Emsland output is being refined in the Nerag refinery at Misburg.

Synthetic Rubber

Dismantling at the plant of Chemische Werke Huels is due to start on August 31. All installations for the examination and inspection of synthetic rubber and for the manufacture of butadiene are expected to be removed, but some ancillary plants which originally were to have been dismantled will now be left in position.

The management has submitted a memorandum to the occupation authorities, pleading for the retention of plant sufficient for an output of 300 tons a month of butadiene, and three processing divisions formerly used for the production of buna on the ground that these are needed for the manufacture of "Emulsion 1073," a polystyrol emulsion into which about 25 per cent of butadiene are incorporated as a softener.

About 5 million marks are said to have been spent on the development of this product the application of which is recommended as a floor covering, for the manufacture of waterproof paper, and as a component for indiarubber products.

Ruhrchemie AG continues its campaign for the retention of its Fischer-Tropsch plant on the ground that its main value was the provision of high-class products for the manufacture of washing agents, textiles and leather. The Fischer-Tropsch products were not, it is claimed, substitutes, but equivalent, if not superior, to products from other raw materials, and could not be replaced by imported chemicals.

American Influence

Director Dr. Tramm, who recently visited the U.S.A., alleged that influential American circles were against the dismantling of Fischer-Tropsch plants. They were, he claimed, greatly interested in German research in this field and were trying to reduce the extent of dismantling operations as far as possible.

Hydrierwerke AG, which has moved from Rodleben to Dusseldorf, has resumed the production of solvents, including tetrahydronaphthalene and methylcyclohexanol, and softeners for the plastics and rubber industry; the production of some alcohol sulphonates has also been started again.

Producing sulphuric acid for chemical works in the Ruhr area, Chemische Fabrik Curtius AG, Duisburg, has overcome the war damage and hopes soon to resume full output.

Deutsche Bergius AG, Mannheim-Rheinau, also reports that the heavy war damage has been partly made good.

A fall in prices attributed to heavy lawful and illicit imports, however, had to be met while the plant was still in an initial stage of production. As a result, the company had to apply for a court order granting it a respite for payment of debts. An interim credit has been made available to the company with the consent of the Baden State Government, but at present the workers are still working short-time.

The recent price fall in the world market for non-ferrous metals has brought a number of German lead and zinc producers into the danger zone where it is doubtful whether producing costs can be met. Investigations have therefore been

(*continued at foot of next page*)

LEAD REACHES £87 5s. TON

Two More Price Rises

THE recent instability of United Kingdom lead prices, unsettled by the exceptional fluctuation of United States' values with which the Ministry of Supply has sought to achieve parity, has resulted in two substantial increases, last week and this.

The price of good soft pig lead at the middle of this week was £87 5s. per ton, which included two increases in quick succession, of £1 7s. 6d. on August 3 (to £82 2s. 6d.) and by a further £2 2s. 6d. on August 9.

Lead metal prices have risen by the following stages since the lowest post-war price of £75 10s. was announced—and maintained for two days—on July 12: July 14, £81; July 26, £82 7s. 6d.; July 28, £83 15s.; August 3, £85 2s. 6d.; August 9, £87 5s.

American commentary on lead prices in New York, which reached 15⅛ cents per lb. this week, after having been 21½ cents at the beginning of March and only 12 cents at the end of that month, discounts the possibility of any further large increase The latest rises are being associated with temporary influences, including U.S. Government stock piling and the re-imposition of import duties.

PETROLEUM CHEMICALS IN GERMANY

(continued from previous page)

started to ascertain the level of producing costs in the various mining areas of western Germany.

On behalf of the producers it is being argued that the production of indigenous ore could meet all reasonable requirements of the German market in the next two years. Domestically-produced zinc is, indeed, at present lacking sufficient outlet.

In the eastern zone of Germany the production of fluorspar is to be resumed in the Wiedersberg mine which belonged to I.G. Farbenindustrie. This mine and the Ludwig-Vereinigt-Feld plant together are expected to produce approximately 500 tons of fluorspar a month.

A process for the manufacture of enamel from cobalt slag is reported to have been developed by Schmidt & Sohn, Schwarzenberg-Neuwelt, Erzgebirge; it is claimed that the new process is independent of nickel and cobalt oxides and of felspar, while meeting hygienic requirments. The raw material is taken from slag heaps.

STEAM ECONOMY

Good Dyeworks Practice

THE measures taken to effect fuel economy in the dye-house of Courtaulds, Ltd., at its Bocking (Essex) factory, by preventing the escape of steam from dyeing machines, are described in *Fuel Efficiency News*.

Mainly as a result of fitting hoods over its winch dyeing machines, this firm is reported to have effected fuel savings in some dyeing cycles of as much as 60 per cent. Because of the shortage of stainless steel at the time, hoods were made of duralumin, and armour-plated glass windows were fitted to the sides to allow observation.

It is estimated that, although the hoods cost only about £2500, the direct saving of steam at the winch machines themselves represented a reduction of £6000 in fuel costs in one year's working.

Many Benefits

Apart from the direct saving in fuel, the advantages of using enclosed winch machines have been found, from an investigation made at Bocking, to be: Increased production due to greater availability of steam from boilers hitherto operating at peak capacity; increased rate of dyeing and better penetration of dye; better working conditions—dry floors, and a clearer atmosphere; elimination of condensation "droppings" from the roof on to fabric; prolonged life of dyehouse roofs; possible simplification of future dyehouse design by eliminating the need for fans, trunking, false roofs, etc., and additional saving of fuel because of the reduced need for warm, ventilating air to disperse moisture from the atmosphere in the dyehouse.

In view of the very great economies effected and the importance of this matter to the dyeing and other trades in this country, Courtaulds, Ltd., decided to make this experience freely available, in the first place by the information given in a paper read before the London section of the Society of Dyers and Colourists, and later by a full publication of the technical data as a scientific paper in the journal of that society.

Chemical Exports

The declared value of exports of chemicals, drugs, dyes and colours in the second quarter of 1949 was £22,021,000; the estimated value at 1938 prices was £8,930,000. Coal exports in the April to June quarter were valued at £10,643,000.

HEIGHTENED ACID RESISTANCE

Passivation of Enamel Surfaces

From OUR NEW YORK CORRESPONDENT

SOME important results of experimental acid pre-treatment of porcelain enamels on the acid resistance and abrasion resistance of treated specimens have been produced in an investigation still in progress at the U.S. National Bureau of Standards' enamelled metals laboratory. The workers concerned are W. N. Harrison, J. C. Richmond, and J. R. Crandall, all of the bureau's staff. Full explanations must await the conclusion of the investigation, but, because of the current interest in these phenomena, the research workers have disclosed some of the results thus far obtained.

Tests made earlier to compare the relative effects of hydrochloric, acetic and citric acids on a number of enamels revealed that treatment with acetic acid, which produced only minor visible attack, strongly inhibited further attack when subsequently treated with citric acid, although the citric acid severely attacked the untreated areas of the same enamelled specimens.

It was found that pre-treatment with acetic acid in concentrations from 0.5 to 50 per cent for periods of five minutes or longer, were effective against subsequent treatment with 10 per cent citric acid. Treatment with butyric acid for 15 minutes produced the same effect, but neither tartaric nor lactic acid was effective.

This passivation effect, the bureau points out, may be explained on the hypothesis that the acetic and butyric acids preferentially leach alkalis from the enamel surface, leaving behind a silica-rich film which is resistant to further solution film in citric or stronger acids. With citric acid, on the other hand, the attack apparently proceeds to a greater depth before sufficient thickness of this film is built up to inhibit further solution.

During the investigation it was found that treatment for 15 minutes in 10 per cent citric acid appreciably reduced the abrasion resistance of certain enamels having Class B or Class A acid resistance (Porcelain Enamel Institute standard test), this effect being more pronounced on titanium-type enamels than on antimony-type enamels. In no case was the abrasion resistance of Class A enamels affected.

The effect of abrasion (such as would occur, for instance, when a stained spot on an enamelled article is scoured) was sufficient to reduce the rating on some enamels from a good Class B by the standard test to a poor Class C by the same test modified to include the abrasion treatment. The same amount of abrasion had no appreciable effect on the untreated areas of the specimens.

It is believed that these two effects are related, and that the silica-rich layer resulting from preferential solution of the alkali is less resistant to abrasion than the

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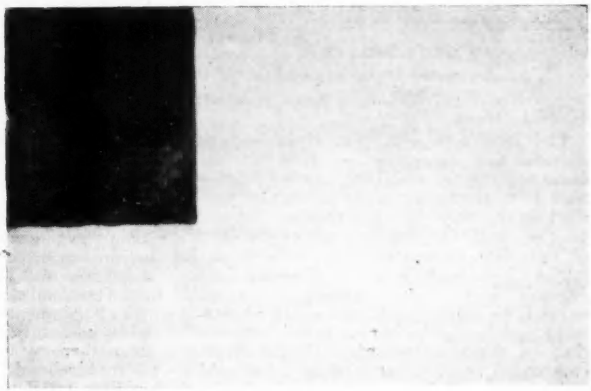


A 4 in. by 6 in. enamelled specimen, showing effect of pre-treatment with 10 per cent acetic acid on resistance to subsequent treatment with 10 per cent citric acid. The dark area (upper left) was treated with citric acid only and was badly etched

Carbon Black in Soil Experiments

Novel Use to Raise Soil Temperatures

THE knowledge that black materials are the most effective heat absorbers has encouraged some unconventional experiments in the U.S.A., employing low-grade carbon black in soil treatment to promote a significant rise in surface temperatures.

Collaborating in this research at the Massachusetts State Experiment Station with Prof. John Everson, of the University of Massachusetts, was Mr. J. B. Weaver, assistant director of research of Godfrey L. Cabot, Inc., the Boston makers of carbon black associated with the present carbon black project for Merseyside.

The soil employed in the temperature experiments was a fine, sandy loam on the grounds of the University of Massachusetts, which had been fertilised. The carbon black was mixed into parts of the soil to a depth of about 2 in., while other areas were left untreated. Accepting the estimate that an acre contains 2 million lb. of soil in the top 7 in., the report notes that the application of 4000 lb. of carbon black to an acre gave a concentration of about seven-tenths of one per cent. This is sufficient to darken the soil.

Temperatures were recorded with a potentiometer every 15 minutes, for more than a year. During the spring and summer, maximum daily temperatures reached by the treated soil surface were higher on the average, by about 2°F., than maximum temperatures of untreated soil surfaces. At a 2-in. depth, the carbon-treated soil showed maximum daily temperatures about 3.4°F. higher than those of the untreated soil. Minimum daily temperatures were slightly higher for the treated than the untreated soil, the average difference being nearly one per cent at the surface.

At temperatures above 42°F. the rate of biological activity generally doubles with each temperature rise of about 18°. Thus, it is pointed out, even a 2° temperature increase can mean a significant increase in the rate of plant growth.

Use of carbon black made from natural gas would be relatively expensive, at present prices—from 3½ to 7 cents per lb. Application rates as low as 2000 lb. an acre have been found effective, however, the chemists state. Moreover, a single treatment of a given tract should suffice for a number of years, even though some loss through erosion may occur.

There is no evidence, as yet, to indicate that carbon black "acts as a plant nutrient, is itself digested by plant roots, or has any other direct effect on plants."

HEIGHTENED ACID RESISTANCE

(continued from previous page)

original surface, although more resistant to acid attack.

The results suggest that titanium-type enamels are especially sensitive to the observed effects, and that routine inspection tests should be made in regular production to assure that the composition and processing of the enamels are maintained at optimum conditions.

The increased use of titanium-type enamels and the sensitivity of these enamels to attack by abrasion after treatment with acid, the bureau notes, indicate that an abrasion treatment should be incorporated in the standard test for acid resistance.

BIOCHEMISTS' CONGRESS

CAMBRIDGE next week will be the centre of the first International Congress of Biochemistry, being held from August 19-25.

The congress was initiated by the Biochemical Society with the support of the International Union of Chemistry. The president is Prof. A. C. Chibnall, and the chairman of the executive committee Prof. E. C. Dodds.

Reading of papers and discussions will be divided into 12 sections, and there will be lectures and visits to research stations and laboratories.

The sections are: Animal nutrition and general metabolism; microbiological chemistry; enzymes and tissue metabolism; proteins; clinical biochemistry; structure and synthesis of biologically important substances; cytochemistry; biological pigments; oxygen carriers and oxidising catalysts; hormones and steroids; chemotherapy and immunochemistry; plant biochemistry; industrial fermentations.

Checking of Research Measurements

Fallacy of the "Best Two Out of Three"

IN scientific and engineering investigations a single measurement of an unknown quantity is seldom considered sufficient. Two or more measurements are usually made in order to establish a check on instrumental errors, operators' errors in making readings, and the reliability of the sample.

These multiple measurements have two principal advantages: They reveal by their concordance the precision of the measuring process, and they make possible the use of an average of several measurements which will, in general, have a higher precision than one measurement alone, states the director of the U.S. National Bureau of Standards in an article contributed to the *Journal of the Franklin Institute.*

Common Practice

If three measurements are made, it is fairly common practice for students to take the "best two out of three"—averaging the two values closest together and discarding the other. Recently, however, Dr. W. J. Youden, of the statistical engineering laboratory at the bureau has shown that this procedure very often leads to less precise results than the averaging of all three measurements together.

Three measurements is the minimum number that can conceivably reveal one of the measurements to be unreliable in a new experimental situation. Intuition suggests that if two of the three measurements are in close agreement while the third stands apart considerably removed from either of the others, then there may be grounds for suspecting and perhaps rejecting the third value. In terms of the difference between the two in good agreement, how different may the third measurement be before it should be suspected?

Since this problem is important to all who make and interpret measurements, it is a little surprising that an answer has only recently been found. An approximate solution has been obtained in the bureau's statistical engineering laboratory through an empirical study of triads drawn at random from a large group of measurements constructed to conform to the characteristics of a normally distributed set entirely free from any gross errors.

In this way, it is possible to examine a great many sets of three measurements and to determine, for example, how often the two differences between adjacent values in a set of three measurements will bear a ratio of 5 to 1, 10 to 1, 20 to 1, or any other ratio that might be considered unlikely in the normal course of events.

Empirical Study

If only one out of a hundred sets of three measurements contained a measurement differing from the others by as much as five times the difference between the two closest, then such an observation might reasonably be discarded in actual experimental data. But the empirical study actually showed that a rather unbalanced spacing between three measurements occurs quite frequently.

In fact, the ratio of the two differences was as much as 16 to 1 in 10 per cent of the sets of three measurements. In this connection, it is important to note that high ratios can result when two of the readings are very close or coincident while the third is not far removed.

A Comparison

The mathematical solution of this problem has been obtained and the frequency of occurrence for various ratios of the two differences has been calculated. The following table shows for certain ratios the results of an empirical sampling study of 400 sets of three measurements compared with those predicted by the exact mathematical solution of the problem.

Ratio of Large to Small Difference	Frequency in 400 sets	Theoretical Frequency
4.0 or more	149	145.2
9.0 or more	76	69.4
19.0 or more	38	33.9

These results reveal that in an average of one out of every 12 sets, one of the measurements will be at least 19 times farther away from its neighbour than the difference separating the two closest. Since in every 12 sets one shows such a spacing for measurements with no gross observational errors, it appears that measurements which should be retained are often dropped from the record.

Polyalkylene Glycols

Wide Range of the Newer Synthetic Products

by A. E. WILLIAMS, F.C.S.

BOTH the ethylene and propylene series of glycols have become well established in industry, serving a wide variety of purposes, as diverse as the cooling of aircraft engines, the preparation of other organic chemicals and as plasticisers.

To this already extensive range of glycols, an entirely new synthetic group of polyalkylene glycols and derivatives has recently been added, which for certain applications in industry compare favourably with materials hitherto in use. Some of these applications include both high and low-temperature lubrication, the lubrication of textiles and rubber, heat transfer media, solvents, plasticisers, etc.

Special Characteristics

These synthetic materials differ both chemically and in performance characteristics from petroleum oils, animal and vegetable oils, silicones, and other synthetic oils. They have been developed by the Carbide & Carbon Chemicals Corporation, U.S.A., by which they are identified and are marketed by the trade name "Ucon," and are being distributed in this country.

The four series of these fluids which have become available are the LB and D series, which are insoluble in water; and the 50-HB and 75-H classes, both water soluble. They are inert to the most generally used metals, and have little or no effect on most natural and synthetic rubbers.

Applied as lubricants, they can be compounded with additives to produce materials suitable for use under extreme pressure conditions, where such qualities as improved film strength are required. They serve also in the preparation of various types of grease and stable, and concentrated dispersions of colloidal graphite can be made. Mixtures having non-Newtonian properties have been prepared by the addition of sub-microscopic silica to the lubricants.

These silica mixtures include transparent greases and liquids which increase in apparent viscosity with increase in temperature, or with increase in rate of shear. They also have advantages as vehicles for abrasives, molybdenum disulphide, mica, magnetic iron powder, and other solids.

As hydraulic fluids the Ucon products may be employed alone or in combination with other liquids, and they are of special value in equipment which requires efficient lubricating action such as fluid-actuated machine tools, etc.

Because they have solvent power and resistance to sludge and varnish formation, these materials maintain in a clean condition such parts as small orifices, valve seating surfaces, and other vital components. The desirable viscosity-temperature properties and low pour points of the fluids are valuable in many hydraulic applications.

Their solvent power for the decomposition products of petroleum oils promotes a cleaning action in equipment in which these oils have been used. From these synthetic lubricants it is possible to prepare shock absorber fluids having good operating characteristics.

The factor of inflammability is of importance in the application of hydraulic fluids for special purposes, and the search for a suitable fluid for use in aircraft resulted in the development of the so-called hydrolube fluids in the U.S.A. Naval Research Laboratory.

The Ucon hydrolube hydraulic fluids are composed of water, ethylene glycol, other high-boiling water-soluble liquids, a high viscosity synthetic fluid, a combination of liquid and vapour phase corrosion inhibitors, and additives to improve wear properties. By varying the proportions of water, ethylene glycol, and Ucon synthetic fluid, the viscosity of hydrolube fluids may be varied over a fairly wide range to meet different requirements.

Laboratory and Textile Uses

As heat transfer media, the synthetic liquids have found application in laboratory constant-temperature baths and in rubber and plastics processing equipment. Their advantage in this sphere is that they do not form sludges or gums and, as they do not carbonise under most conditions, they are particularly suitable when deposits would cause premature failure of electric heating elements and an appreciable loss in heat-transfer efficiency.

In the processing of textile materials the water solubility of some of these materials makes them easy to apply and

to remove, and in this sphere they are excellent lubricants, are non-staining and do not produce sludge, while they have little tendency to build up static charges on yarn.

Such characteristics make the liquids of special interest in processing many types of textile fibres, and those liquids which are insoluble in water are readily emulsified, being easily washed off the fibres with a mild soap scouring. Different classes of these lubricants are of value as coning, spinning and sewing oils for cellulose acetate, nylon and glass fibres. On cotton and viscose rayon they soften as well as lubricate, which suggests potential use in finishing compounds.

Some of the liquids with higher viscosities offer excellent possibilities as wool oils which wash out of yarn or cloth with a water rinse. This property is of special interest in the production of knitting yarns and other forms of textiles which cannot be subjected to the rigorous scouring necessary in eliminating normal mineral and sulphonated oil types of lubricants. Tinting colours, when used to identify yarns, are more easily removed from the material by a light washing when the water soluble varieties of these liquids are used as lubricants.

Miscibility

In applying Ucon synthetic lubricants to textile materials the question of their compatibility with mineral, vegetable and animal oils has to be considered. The synthetic products are miscible only in limited proportions with the very low viscosity mineral oils; hence mixtures with such oils may give unsatisfactory results. A greater degree of compatibility is obtained generally with vegetable and animal oils and these can often be used as diluents for the synthetic lubricants. Since the latter are compatible with proteins, they may serve as flexibilising agents where these materials are used as binders and coatings for paper. The widely used synthetic resins, urea-formaldehyde and melamine - formaldehyde, when employed as coatings for paper, may be modified to yield superior products by the addition of the synthetic lubricants prior to the acid condensation, or during the formation of the "A" stage resin. Such compounds are also of interest in the sphere of adhesives and sizes.

Tannery Applications

In the treatment of leather, the resistance to oxidation and gumming of the synthetic fluids suggests good ground for their use. Some of the fluids may be added to the leather either alone or when dissolved in water, while some of the insoluble fluids may be emulsified in water or applied in the anhydrous form. The lubricants can also be used in the pre-fat liquoring of hides which are to be stored, and then sorted and tanned at a later date.

A new type of suede leather dressing, based on the synthetic lubricants, has been formulated and gives a soft finish which is not oily or greasy.

The boiling ranges of Ucon lubricants are in general higher than those of petroleum oils of comparable viscosity, while the vapour pressures of many of them are less than 0.01 mm. Hg. at 68°F. Evaporation rates vary, depending upon the product, surface area exposed, temperature, and the presence of oxidation inhibitors or catalysts.

Oxidation is an important factor in evaporation, since the oxidation products are under most conditions, largely of low molecular weight and volatile compounds. Oxidation inhibitors retard evaporation when oxidising conditions prevail.

The hygroscopicity of the synthetic lubricants is relatively low, as is shown in the

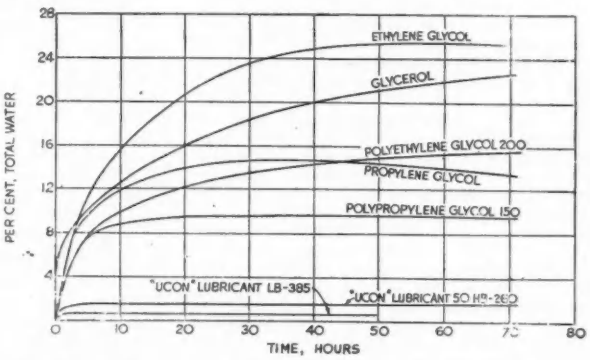


Fig. 1. Hygroscopicity at 69°F. and 62 per cent RH

graph, Fig. 1, which compares this property with that of some other materials, at a temperature of 69° F. and with 62 per cent relative humidity.

Specific heat determinations on various types of these lubricants give values ranging from approximately 0.41 at a temperature of 0° F. to 0.54 at a temperature of 300° F.

Typical thermal conductivities, at a temperature of 122° F., B.Th.U./hr./sq. ft./° F./ft., are 0.0847, 0.0859 and 0.0924. At a temperature of 194° F. these figures become 0.0842, 0.0854 and 0.0922 respectively.

Surface tension measurements, dynes/cm./68° F., made on some of the products give values ranging between 33 and 40. Spontaneous ignition temperatures of some of the lubricants, both with and without the standard oxidation inhibitor, are over 700° F., except for the very low viscosity grades, which are above 600° F. Spray inflammability tests show that high oxygen concentrations are required for ignition of mists. While these and other tests indicate that this type of product is more resistant to ignition and burning than many other materials, the lubricants are readily combustible under the proper conditions. The inflammability of the lubricants can be considerably reduced by mixing with suitable products such as water, certain phosphorus derivatives, and halogenated compounds.

Results so far achieved with these polyalkylene glycols show that their outstanding characteristics as lubricants to be summed up as follows: High resistance to formation of sludge, gum, varnish and carbon; a minimum change in properties after extended use; little change of viscosity with change of temperature; low stable pour points, and only a slight effect on both natural and synthetic rubbers.

Active Metal Catalysts

Improved Hydrosilicate Processes Described

IN catalysts of the nickel-kieselguhr type, the nickel is present largely in the form of hydrosilicates. The catalysts are, however, subject to certain drawbacks: they cannot be worked up into pellets or tablets of considerable mechanical strength; nor is the kieselguhr readily filterable, although it has been hitherto indispensable.

It has now been found that catalysts of long life, containing particularly active metals, can be obtained by converting the metals, wholly or partly, into hydrosilicates, followed by reduction. This principle forms the subject of English patent application No. 15040/1948 (Conc. date 4.6.47), of N.V. de Bataafsche Petr. Maat.

If catalyst carriers are used they must not contain free silica acid so as to form substantial amounts of insoluble hydrosilicates of the active metals. Widely varied carrier materials may be used in the new process, and the metal range is also wider. Fe, Co, Ni, Pt, Pd, and other metals of the 8th group are employed. Carriers may be chosen from sintered kieselguhr, alumina, carborundum, manganese silicate, magnesium carbonate or oxide, or from other materials. A carrier having high heat conductivity is preferred in the form of powder or grit.

The active metal may be precipitated from one of its salts in solution by means of a soluble silicate, in the presence of one of the carriers named, and converted into hydrosilicate.

For the production of cobalt catalysts for the Fischer-Tropsch synthesis, reduction should be done at a moderate temperature—300-400° C.—if an active catalyst is to be formed, and only part of the active metal should be converted into hydrosilicate. For other reactions temperatures up to 500° C. may be used.

The catalyst may also be obtained from SiO_2 by precipitating thereon all the active metal in the form of a basic compound, followed by steam treatment. Alternatively, the precipitator may be left for a prolonged period in contact with the alkaline liquid before separation. A readily reducible metal compound may be present and reduced.

The catalyst, however prepared, is finally compressed into tablets, and a method of hydrogenation using such catalysts is claimed in this patent.

Copper Deposits in Thuringia

Deposits of copper-ore have recently been opened up at Sangershausen in Thuringia where some 3000 workers will find employment, according to the *Bulletin on German Questions.*

ACETYLENE CHEMISTRY

Rich Field of Contemporary Applications *

THE principal reason why synthetic acetylene has not been produced commercially to-day seems to be that it requires approximately as much power per thousand cu. ft. of acetylene produced in 15 to 25 per cent concentrations as it does to make the same amount of gas in 99.6 per cent concentration from calcium carbide.

The cost of purifying and separating the the other constituents is also an important factor. Another is that many materials catalyse the reaction at the high temperatures required and form undesirable by-products which are difficult to eliminate in the purification process.

The Jasco process was used to some extent at Huls, Germany, during the recent war, and according to technical committee reports, a 15 to 17 per cent acetylene was obtained with a consumption of electricity of 360 to 390 kilowatt-hours per thousand cu. ft. of pure acetylene. However, technical committee reports indicate that this installation was necessitated by the war emergency and required a tremendous investment.

Neoprene

For many years Father J. A. Nieuwland and his co-workers at Notre Dame University accomplished an enormous amount of work with acetylene chemistry. In the course of this work in the late 1920's he had difficulty in purifying the mixture of mono- and divinyl acetylene, which was made by passing acetylene into cuprous chloride catalyst under certain controlled conditions.

In co-operation with Du Pont, a process was worked out for the production of monovinyl acetylene, purifying it, and treating it with hydrogen chloride to form 2-chlor-butadiene-1,3 called "chloroprene," which on polymerisation gave neoprene.

Many patents cover this work. The process was commercialised in 1932, and the resulting product sold for $1.05 a pound. Neoprene is made in different types and has a long life under certain conditions under which natural rubber rapidly deteriorates.

Commercial uses for neoprene were soon found in spite of its high cost, for it resists heat, sunlight, many chemicals, oil, and gasolene, and, furthermore, neoprene is not flammable and has practically the same physical properties as natural rubber. Neoprene had many war uses, such as for sealing aviation fuel tanks and for withstanding the action of oils, solvents, and heat.

The maximum production during the war reached 135 million lb. annually. It is priced now at 32 cents per lb., which compares with approximately 19 cents per lb. for natural rubber f.o.b. docks, 18.5 cents per lb. for GR-S synthetic rubber, and 8.5 cents per lb. for reclaimed rubber, Father Nieuwland continued to make rich contributions to our technical literature on the chemistry of acetylene until his death in 1936.

The Vinyl Compounds

Numerous patents existed for the preparation of vinyl chloride from acetylene and hydrochloric acid. One method employed by Nieuwland was to pass acetylene through aqueous hydrochloric acid containing cuprous chloride as catalysts. Mercuric salts were also used as catalysts. However, the art never reached the commercial stage in this country until about 1927, when it was learned how to polymerise vinyl chloride to a workable plastic material.

Vinyl chloride became a commercial product in 1935. It was found to make excellent floor coverings, waterproof and non-flammable insulation for electric wires and cables, wrappings for underground pipe lines, and serve many other uses dependent on its property of being insoluble in acids, alcohols, water, and most other ordinary solvents.

The popular demand for a safety glass ushered vinyl acetate into commercial production in 1937. It was made by treating glacial acetic acid with acetylene in the presence of a catalyst such as a mercury or zinc salt. The first safety glass consisted of two thin sheets of glass cemented tightly together by a plastic material, cellulose nitrate. The transparency of such glass was impaired by darkening and discoloration.

Cellulose acetate formulations were then used for a number of years as replacements for cellulose nitrate. Casualties from flying glass in automobile acci-

* By C. J. Herrly, Niacet Chemical Division, U.S. Vanadium Corporation, in a paper given before the International Acetylene Association in Pittsburgh, the full text of which appears in *Chemical and Engineering News* (1949, July, p. 2062-66).

dents were solved by the use of the polymerisation product of vinyl acetate and butyraldehyde called polyvinyl butyral.

Because of the exceptional adhesive power of the vinyl compounds, even at very low temperatures, polyvinyl butyral prevents flying splinters when glass is broken. Glass bonded with polyvinyl butyral holds its transparency indefinitely when exposed to the sun and severe weather conditions.

Industrial applications of vinyl polymers, resins, and plastics seem to be innumerable because of the possible variation in the size of the polymerisation molecule which is held together by carbon-to-carbon linkage, resulting from the saturation of the original double bond of the vinyl compound.

Copolymerisation with other products such as vinyl chloride and aldehydes, makes possible a wide variety of products to suit specific conditions.

Another important development during this decade was the discovery by Shawinigan Chemicals, Ltd., that in the manufacture of acetic acid by air oxidation, acetic anhydride is formed and joins with water also produced in the reaction, as shown below, to form acetic acid:

$$CH_3CHO + O_2 = CH_3COOOH$$
(peracetic acid)

$$CH_3COOOH + CH_3CHO = H_2O + (CH_3CO)_2O$$ (acetic anhydride)

$$(CH_3CO)_2O + H_2O = 2CH_3COOH$$
(acetic acid)

They found that by adding a diluent, such as ethyl acetate to the acetaldehyde to be oxidised, a large part of the water formed was prevented from joining with the acetic anhydride to form acetic acid, so that the process produced a mixture of acetic acid and acetic anhydride.

The requirements of the cellulose acetate industry for acetic anhydride were originally filled by neutralising the recovered acetic acid from the process with soda ash, and treating the sodium acetate thus obtained with sulfuryl chloride to form acetic anhydride.

During this decade, the synthetic acetic anhydride process replaced the older process with a better product at lower cost, and thus took a large part of the acetic acid market.

It was during this period that Reppe[1], together with a large number of German scientists and engineers, made use of well-known technical data and methods to commercialise high-pressure and high-temperature synthesis of chemicals from acetylene. The vinylation reaction produced vinyl ethers by the action of diluted acetylene with alcohols under pressure, elevated temperature, and with an alkaline catalyst.

The ethynylation reaction combined acetylene with other compounds without breaking the triple-bond carbon linkage, by means of copper acetylide catalyst under closely controlled conditions of temperature, pressure, and acidity. By means of this reaction he worked out a new process to make butadiene synthetic rubber.

Wartime Products

One of the first products Reppe commercialised by combining acetylene and formaldehyde was butynediol, and later, by a combination of these two processes, he obtained the product polyvinyl pyrrolidone, which was used as a blood plasma substitute by Germany during the recent war.

General Aniline and Film Corporation has just recently put a new pilot plant into operation at Grasselli, N. J., to begin the commercial production of this new line of synthetic acetylene products in this country. They are expected to have wide application in the manufacture of resins and pharmaceuticals, as well as in the paper, textile, rubber, and other industries.

During World War II, output of acetylene chemicals was greatly expanded to meet essential uses. Calcium carbide output was expanded in this country and Canada to approximately 1,050,000 tons annually, exclusive of that used for the manufacture of calcium cyanamide.

From some of our technical committee reports, it has been figured that Germany's production of calcium carbide in 1939 was 1 million short tons. Other technical reports state consumption of acetylene for chemicals during 1942 was 7.2 billion cu. ft., or approximately 800,000 tons of carbide[2] which was probably the peak year of production in Germany before effective bombing operations began to curtail production.

Because of the absence of accurate figures during the war period, it is difficult to estimate what percentage of our carbide production went into acetylene chemicals. However, according to United States Tariff Commission figures for 1948, carbide production in this country had dropped from a war peak of 825,000 tons to 682,463 tons, and the Canadian production for the same period, exclusive of that produced for calcium cyanamide, is said

to have dropped from 225,000 tons to 150,000 tons.

Of this total American production, 832,463 tons in 1948, it is estimated that approximately 540,000 tons, or about 65 per cent, went into acetylene chemicals, including neoprene rubber and acetylene black.

Acetylene was used in large quantities during the war for production of acetic anhydride for the powerful explosive RDX, which was used in the "blockbuster" bombs. Large quantities of acetaldehyde were used for the production of pentaerythritol, which in turn was nitrated to produce a sensitive explosive used in anti-aircraft shells.

Vinyl compounds were used for thousands of miles of coated cable and wiring on our warships because of their unique property of not supporting combustion in case of a hit, and because of their waterproof quality and other unusual attributes.

Chemicals from acetylene were important in the production of pharmaceuticals such as acetic acid for acetanilide, vinyl acetate for sulphathizole, acetonitrile for vitamin B_1, and for many standard drugs, medicines, and pharmaceuticals required in enormous quantities during this emergency. The Chemical Warfare Service required large quantities of acetate acid and sodium acetate.

Numerous Applications

With the drop-off in demand for war uses, our energies naturally are being applied to peacetime needs and industrial uses.

Recent figures from the United States Department of Commerce report the solvent industry has grown from a half-million lb. volume 25 years ago to over six billion lb. per year. Our vinyl resin production has grown from 1.2 million lb. in 1939 to an estimated 230 million lb. in 1948.

These products are now widely used in the automotive industry; in the upholstery industry for coating fabrics; in the leather, shoe, and handbag industry; for manufacturing toys, wearing apparel, shower curtains, home building materials, and decorations; and a host of other uses.

A recent use of the vinyl resins, developed on account of their outstanding property of adhesion to metals, is that of vinyl butyral paints as the basic coat for ship bottoms for anti-fouling purposes. The top coating is paint based on a copolymer of vinyl butyral and vinyl chloride and formulated with components toxic to sea organisms.

This development is expected to save the shipping industry millions of dollars annually in dry-docking and repainting because of the long wearing properties of this coating. It is also being used on buoys.

Further Development

Another vinyl resin development is the new Vinyon fibre, a material composed of approximately 60 per cent vinyl chloride and 40 per cent acrylonitrile. This vinyl compound, soluble in acetone, is forced through spinnerettes to form a thin filament from which the acetone is evaporated. The filaments are then joined to form threads which, in turn, can be woven into textile and fabrics of unusual properties.

Monochloroacetic acid has been expanded considerably for the production of carboxymethylcellulose water-soluble types of resins for the coating and adhesive industries, synthetic indigo, and the insecticide 2,4-D (2,4-dichlorophenoxyacetic acid) now used extensively for weed killing on our lawns, golf courses, farms, railroads, etc. Production of 2,4-D is reported at 8,433,000 lb. for the last four months of 1948.

Another important insecticide is DDT (dichlorodiphenyltrichloroethane). One of the products used commercially for its manufacture is paraldehyde. This coutry's production of this product in 1948 is reported at 18,346,000 lb., an amount proving to be more than our insects are willing to consume. Neoprene production for the year 1948 is reported at 70.5 million lb.

As to our future outlook for the acetylene chemical industry, my prediction is we have merely scratched the surface of its industrial uses and applications. There are at present nine large chemical companies in this country, and one in Canada, producing chemicals from acetylene, with a total of 15 plants at various locations.

Carbide production is being modernised and expanded in this country and increased application of science to industry is being gradually realised, but these measures are not enough. We need to expand greatly our output of highly educated, scientifically trained men and women with the ability to apply science to the needs of the public as well as our industries.

REFERENCES

[1] "Advance in Acetylene Chemistry," Washington, D.C., RFC Office of Rubber Reserve, Research and Development Section, 1945.

[2] H. B. McClure and R. L. Bateman, *Chem. Eng. News*, 25, 3208-14 and 3286-9 (1947).

Technical Publications

ALUMINIUM alloy castings are being increasingly used in general engineering. The elements present in aluminium castings and alloys, with some notes on methods for their introduction, are the subject of an article by D. C. G. Lees (The Aluminium Development Association), in the *Murex Review* (Volume 1, No. 4, 1949), published by Murex, Ltd., Rainham, Essex. Another article, by E. A. Chidley, describes the method used in the Murex laboratories for the determination of molybdenum in ferro molybdenum. Copies of the *Review* may be obtained on application to the publishers.

* * *

THE Manufacturing Chemists' Association, Inc., has issued, in the U.S.A., Manual Sheet TC-7, "Tank Car Loading and Unloading Platforms." The seventh in the association's tank car series, it outlines definite recommendations regarding the type of approach platform which should be used by chemical manufacturers and processors. The publication is being supplied from the association's offices, 246 Woodward Building, Washington 5, D.C., and costs 20 cents, plus postage.

* * *

INCREASING interest in aerosol technique, and its many applications in industry and medicine, lends importance to any new developments. The Phantomyser equipment now available from Aerosols, Ltd., London, for the mechanical production of aerosols, makes use of the compressed air and jet system of primary atomisation. The machine, which is self-contained and portable, consists essentially of an electrically driven air compressor with a system of jets and baffles.

* * *

APPRECIATION of the value of the photoelectric colorimeter as a method of analysis has greatly increased in recent years, and an authoritative work on the subject is therefore welcome. In "Photoelectric Methods in Clinical Biochemistry" (Hilger and Watts, Ltd., 15s.), Dr. G. E. Delory, assistant professor of biochemistry, University of Manitoba, Winnipeg, Canada, describes methods based on several years of experience with colorimetric analysis of biochemical substances. There are 21 illustrations and diagrams.

* *

REQUIREMENTS of the Pharmacy and Poisons Act 1933 and the Poisons Rules,

Illustrating the tendency towards smaller sizes in timing devices, the Londex synchronous process timer is particularly suitable for controlled operation of moulding presses, heat treatment of metals and automatic weld timing

have been set out in the "P.J. Poisons Guide" (fifth edition, the Pharmaceutical Press) to facilitate the handling of poisons by pharmacists in retail business. The guide is divided into four classes which cover all poisons, whether in Part I or Part II of the List. Interleaved copies of the booklet cost 4s.

* * *

A VALUABLE guide to the pharmacist confronted today with a wide variety of emulsifying agents, all having varying properties and requiring different methods of treatment, is now available in "Pharmaceutical Emulsions and Emulsifiers," by L. M. Spalton, published by *The Chemist and Druggist* (pp. 132, price 5s. 6d. post paid). Starting with a simplified presentation of the theory of emulsions, the book covers most aspects of the subject, giving details of handling each type of emulsifying agent and notes on incompatibilities. There is a classified index of over 300 emulsion agents and other substances.

THE FUTURE OF STEEL

Progress Reviewed at Glasgow

SPEAKING at the opening ceremony, last week, of the British Iron and Steel Federation's exhibition, Glasgow, the Lord Provost of Glasgow, Mr. Victor D. Warren, asked three pertinent questions on behalf of the people of Glasgow.

"If what has occurred in coal, railways, and electricity occurs in steel, will the housewives of Glasgow be able to purchase their household requirements in steel any more cheaply because of nationalisation?" he asked. "If we take the example of the coal industry and the multiple stoppages which have occurred since it was nationalised, will the steelworker be any more content or any better paid under nationalisation than he is at present? In what way will the prosperity of the city be affected if steel is brought under national control?"

He was entitled, he continued, to use as his guide for the answers to these questions the experiences the country had already had—airlines which could run at nothing but a loss, railways which could not run trains up to time, and a coal industry which did not produce or export the same amount of coal as it did in 1938.

The British Iron and Steel Federation did well at this time to show the people of Glasgow that here was an industry controlled by private enterprise that paid good wages, and was free from discord.

ADVICE ON RESEARCH

DSIR's Service at Exhibition

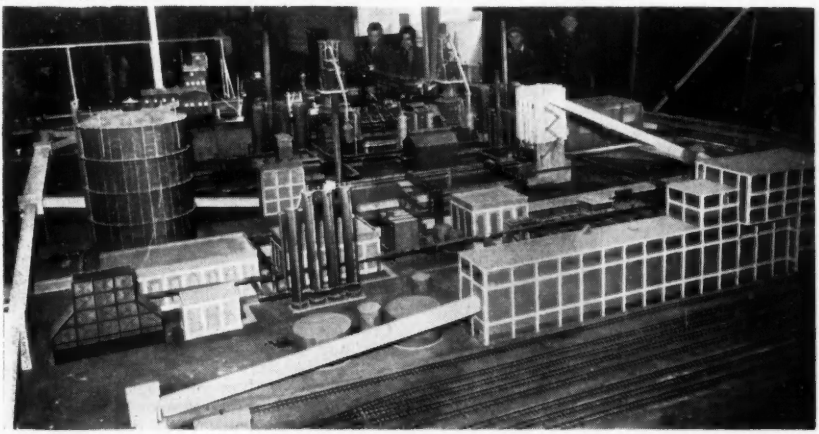
AT the Scottish Industries Exhibition, to be held in the Kelvin Hall, Glasgow, next month, it is the intention of the Department of Scientific and Industrial Research to offer complete consulting facilities for manufacturers. At its stand there will be an information counter and a consulting room, staffed by specialists and members of the department's intelligence division.

The growth of research associations in industry will be emphasised. There are about 40 such organisations in existence, covering a wide range of industries. A number of these will be featured in the section "Building a Factory," designed to explain how research can help in every stage.

There will also be a model of the department's new laboratories at Thorntonhall, East Kilbride, which are to be completed in the next few months, and where research into problems of lubrication and machining will be carried on.

OCCA Exhibition

The London section of the Oil and Colour Chemists' Association is to stage another technical exhibition of raw materials and apparatus on the lines of the one held in April this year. It will be held in March, 1950, at the Borough Polytechnic, London, S.E.



The model steel works, reflecting characteristic current planning, at the BISF exhibition in Glasgow. It included blast furnaces, coke ovens, gas holders and by-products plant

AMERICAN CHEMICAL NOTEBOOK

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From OUR NEW YORK CORRESPONDENT

UNDER a new distribution programme announced by the U.S. Atomic Energy Commission, cyclotron-produced, as distinct from reactor-produced, radioisotopes will be made available to research men in the U.S.A. The programme will augment the present distribution of reactor-produced radioisotopes, which, since August, 1946, has provided 6975 consignments of radioisotopes of nearly 60 elements, representing nearly 100 isotopic species, through the facilities of the Atomic Energy Commission. Only those isotopes having half-lives of more than 30 days will be distributed initially. Included in these are 43-day beryllium 7, 3-year sodium 22, 44-day iron 59, 4-year iron 55, 250-day zinc 65, 90-day arsenic 63, and 56-day iodine 125. Other cyclotron-produced radioisotopes of significant value as tools of research may be added later. In announcing the programme, the AEC says that although the uranium chain-reacting reactor far surpasses the cyclotron in quantity production of radioisotopes created by fission and by certain other neutron reactions, a considerable number of important isotopes cannot be produced with the reactor. The cyclotron is a necessary and vital complement to the reactor for supplying tracer isotopes, because of the wide variety of nuclear reactions it can produce.

* * *

The U.S. Patent No. 2,464,267—Dehydrating Alumina in the Production of Aluminium—has been made available for royalty-free licensing by the U.S. Department of the Interior, to whom the patent was assigned by the inventor, Allan M. Short. In the process described, hydrated alumina is directly distributed on the crusted surface of a molten electrolytic bath to cause partial dehydration of the feed alumina. The feed is then directly mixed with the molten electrolyte and is completely dissolved very rapidly. The slow and incomplete solution of "alpha alumina" of former methods is avoided so that expensive calcination at high temperatures may be dispensed with in the production of aluminum.

* * *

A new family of rubber chemicals, to be known as Wing-Stay S, has been developed by the chemical division of the Goodyear Tyre and Rubber Company. Now available in production quantities, the new material, an amber liquid for which the company claims "excellent anti-oxidant and superior non-staining and non-discolouring properties," may be used in both natural and synthetic rubber and latices.

* * *

Additional facilities for the production of methoxychlor, basic ingredient for a new line of insecticides, and methoxychlor composition (THE CHEMICAL AGE, *61*, 116-120) are to be put in operation at the Linden, New Jersey, plant of Grasselli chemicals department of the Du Pont Company this autumn. The demand for methoxychlor and its various formulations as an insecticide is stated to have greatly increased. The company introduced methoxychlor in 1947, after five years of investigation of its insecticidal efficiency, crop safety and toxicity to warm-blooded animals. In April this year the U.S. Department of Agriculture recommended its use on dairy animals, dairy barns, on forage to be fed to dairy animals, and on other animals being finished for slaughter. The synthetic organic insecticide has high insecticidal efficiency, does not tend to accumulate in body tissues of animals and is effective against flies which have developed a resistance to DDT.

* * *

With the installation of refrigeration equipment nearly complete, the B. F. Goodrich Chemical Company is planning to begin production of low temperature polymerised GR-S "cold rubber," this month at the American rubber plant it is operating for the Government at Port Neches, Texas. When in full production the plant will have a rated capacity of 30,000 tons annually. The Government will then have five plants throughout the country producing the new type of rubber, all operated by private companies. By October, American plants should be turning out 15,600 tons of the rubber each month, towards the programme for an annual production of 200,000 tons. This rubber, made at a temperature of 41°C. instead of the usual 122°C., has shown superior tread wear resistance to standard GR-S, but has still to prove its qualities in other applications.

· PERSONAL ·

PROF. HUMPHREY FRANCIS HUMPHREYS, head of the school of dental surgery at Birmingham University, has been appointed vice-principal of the university in succession to Prof. M. L. E. Oliphant, who will relinquish the office on September 30. Prof. Oliphant will continue to occupy the Poynting chair of physics. DR. F. MORTON, a reader in the department of chemical engineering at Birmingham University, has been appointed to the second chair of chemical engineering in succession to DR. STACEY WARD, who was recently appointed to the chair of mining in the university. A further Birmingham University appointment is that of MR. ALFRED JOHN MURPHY as professor of industrial metallurgy, in succession to PROF. LESLIE AITCHISON, whose retirement, on the grounds of ill-health, was announced earlier in the year.

MR. J. R. G. MARCHETTI, of John Crossley & Sons Ltd., has been re-elected chairman of the board of management of the British Colour Council. MR. H. H. BOWEN, of the Bradford Dyers' Association, Ltd., and MR. E. W. GOODALE, C.B.E., M.C., (Warner & Sons, Ltd.), and MR. D. CARTER (Wolsey, Ltd.), have retired from the board, but will continue to serve in an advisory capacity.

MR. VICTOR D. WARREN, Lord Provost of Glasgow, who is regional manager for Scotland and Northern Ireland of Imperial Chemical Industries, Ltd., has been awarded the Glasgow Corporation Medal for Bravery for the part he played in rescuing a companion and in making a valiant attempt to save the third member of the party when their boat overturned on Loch Arkaig, Inverness-shire, in May.

MR. GUY DUTTON, who has been associated for a number of years with the Sir John Cass Technical Institute, London, and is a contributor to THE CHEMICAL AGE, has sailed for Canada, having accepted appointment as a lecturer in the department of chemistry in the University of British Columbia, Vancouver, B.C.

MR. JOHN M'KECHNIE, secretary of the Mirrlees Watson Co., Ltd., engineers and machinery manufacturers, Glasgow, has died at his home in Giffnock. He was secretary of the company for nearly 20 years, having joined it in 1906 as a junior clerk.

Dr. F. J. Wilkins

Glaxo Laboratories, Ltd., announces that DR. F. J. WILKINS has been appointed executive director in charge of the company's factories at Ulverston and Barnard Castle. He took up his duties on August 2. Born at Cardiff, Dr. Wilkins was educated at the Universities of Wales, London, and Cambridge. He took the degrees of B.Sc. (London) in 1924; M.Sc. (London) in 1927; and Ph.D. (Cambridge) in 1939. He joined Imperial Chemical Industries in 1933, and was loaned to the Filling Factory Department of the Ministry of Supply in 1941. In 1945 he accepted an appointment in the Scientific Civil Service as deputy chief superintendent of armaments research. He became director of chemical research and development in the Ministry of Supply in 1946, and in April, 1948, was principal director scientific research (defence) with responsibility for the research divisions of the munitions side of the Ministry of Supply.

MR. A. E. SMEETON, formerly an export sales manager of Evans Medical Supplies, Ltd., is shortly leaving for Brazil to take up an appointment with Productos Evans Soc. Anon. MR. L. E. SCHOFIELD, who has recently returned from an extensive tour overseas, has been appointed to succeed him.

MR. W. JOHN MERRICK, publicity manager of Evans Medical Supplies, Ltd., has been elected to the council of the Liverpool and District Publicity Association.

HOME

Decline in Use of Rubber

Consumption of natural rubber in the United Kingdom during June amounted to 12,943 tons, the lowest monthly total since August, 1947. Production in Ceylon during June was 6,500 tons, a drop of 500 tons from the May figure.

Groundnut Arrivals

In three months ended June 30, 37,507 tons of groundnuts passed through Liverpool docks. This takes no account of the large tonnages going direct to Lever Bros.' own dock at Bromborough. The bulk of groundnuts arriving in the Mersey still come from West Africa.

Reinstatement of Workers

The Clyde Paper Mills, Ltd., Rutherglen, announces that its orders are now sufficient to justify the full employment of workers who have been on short time since a big pay-off several weeks ago. Employees in the coating department returned to normal working last week-end.

ECA Purchases

ECA contracts with the United Kingdom for the period April 3, 1948-July 15, 1949, cover purchases of 26,000 long tons of rubber, 12,000 long tons of sisal, $4,500,000 worth of industrial diamonds, 200,000 oz. of quinine, 10,000 tons of palm oil and 19,800 metric tons of flaked and fine graphite. Sperm oil and platinum were also included.

Coal Output

Production of deep-mined and opencast coal in Britain last week was the lowest this year, although higher than in the corresponding holiday week last year. Comparative figures are:—Last week: 2,580,700 tons (deep-mined 2,411,300 tons, opencast 169,400 tons); previous week: 2,701,900 tons (deep-mined 2,450,000 tons, opencast 251,500 tons).

Brazil Export Programme

Under the agreement concluded in Brazil last week the United Kingdom will provide exports to the value of £30,775,000, to include chemicals, coal, iron and steel and non-ferrous metal manufactures, textiles, vehicles and pottery. In addition, the accustomed export of petrol and petroleum products to the value of some £7.5 million will continue. The reciprocal import programme, to include rice for Commonwealth countries, will cover goods worth £33,349,500.

Canadian Metals for Britain

Reports from Washington state that $17,006,000 has been granted to Britain to enable her to buy aluminium and copper from Canada under the Marshall Plan.

Cheaper Borax

Reduced prices for borax were announced this week by Borax Consolidated, Ltd. The new rates, per ton in bags, delivered, are: Granular commercial, £27: anhydrous £46.

Mission to Pakistan Likely

The prospect of sending a trade mission to Pakistan this year was discussed at a meeting last week between Mr. A. G. Bottomley, Secretary for Overseas Trade, and Mr. Chulam Mohammed, the Pakistan Finance Minister.

Prices of Oils and Fats

There will be no change in the prices of unrefined oils and fats and technical animal fats allocated by the Ministry of Food to primary wholesalers and large trade users during the four-week period ending September 3.

Employment Maintained

Employment at the end of May in the chemical and allied manufacturing plants accounted for 437,000 persons, according to the July summary issued by the Minister of Labour. This represents no change from the April total, which was some 4000 larger than the corresponding figure for the end of 1948.

New Chemistry Department

Work on the new chemistry block of Aberdeen University, expected to take over two years to complete, is being pushed ahead. The new building, estimated to cost about £300,000, will house the whole of the chemistry department, now at Marischal College. This conforms with the policy of transferring all the scientific departments of the University to Old Aberdeen.

Insecticide Residue on Fruit

The persistence of insecticidal matter on the new season's pears now arriving from Italy has been the subject of examinations made by various Medical Officers of Health. These have shown that a relatively small proportion of the fruit still retains a slight trace of an antiparasitic spray. The Italian commercial authorities have taken steps to prevent further consignments of affected fruit from being exported.

INDIAN SODA ASH MARKET

Local Concern for Production and Protection

From OUR OWN CORRESPONDENT

WORK had recently to be suspended at the two soda ash plants in the Indian Union—Tata Chemicals at Bithapur and the Dhrangadhra Chemical Works—owing to accumulation of large stocks. This surplus is attributed in India to the existence of heavy imports of soda ash at prices lower than the Indian product.

As a result, application was made to the Government for protection or assistance to dispose of existing stocks and permit the resumption of operations.

At the recent inquiry into the claim in Bombay by the Indian Tariff Board Mr. G. L. Mehta, the chairman, recalled that consumption of soda ash in India had been estimated at 112,000 tons annually.

Holding that the consumption of soda ash was often considered a criterion for the industrial development of a country, he stated that the annual consumption in India was 0.6 lb. per head as compared with 56 lb. per head in the U.S.A. While the annual rated capacity of the industry was 46,800 tons, the actual production in India at the peak level was 20,000 tons in 1948.

Prices too Competitive

Referring to the circumstances which had led to the closing down of the two plants, he said that favourable conditions of raw materials and large-scale production had enabled manufacturers in foreign countries to produce soda ash at much cheaper rates. He cited the spectacular increase in production during the war, particularly in the United States and in the United Kingdom and other countries, where the ammonia-soda process had been developed under a system of combines, with controlling interest in plants spread over different countries of the world.

Indian production of soda ash was restricted to the light variety. This meant that industries like glass-making, which required heavy ash, had to import their raw materials.

Since the consumption of soda ash by the glass industry formed approximately one-quarter of the total requirements of India, Mr. Mehta inquired whether the Indian producers of soda ash could not convert part of their soda ash plant for the manufacture of the heavy variety of ash, or alternatively, whether the glass industry could explore the possibility of substituting heavy ash by light ash without a great deal of alteration in the equipment of the factories.

Caustic Soda

Among heavy chemicals proving of most importance to India is caustic soda, and the Industries Conference in 1947 recommended that all measures should be taken to provide at least 20,000 tons in six months.

Caustic soda has been extensively used in India in the manufacture of soap, paper rayon, mercerised cotton, dyestuffs, explosives, vegetable oil refining, and other allied industries. Annual consumption in India is estimated at the following rates: Soap industry 24,000 tons, cotton textiles 15,000 tons, paper industry 900,000 tons, vegetable ghee and oil refining industry 1500 tons, and other chemical industries 20,000 tons.

ISRAELI OPTICAL LENSES

ISRAEL's first major optical lens grinding plant, equipped for large-scale output, has begun operations in Haifa. The firm was established by new immigrants, who brought with them machinery, training and valuable experience in this delicate technical process.

The plant incorporates new inventions developed at the German Zeiss and Steinhel optical works after the war and was shipped to Israel by four immigrants six months ago. With loans from the Jewish Agency and the Israeli Government, they set up their machinery in the Industrial House in Haifa, and are now turning out spectacle lenses for any of the 32,000 possible prescribed combination of eye glasses.

As the cost of glass, the main raw material, is only about 12 per cent of that of the finished product, local lens grinding on a major scale should save a substantial amount of foreign currency. The plant's capacity is said to be sufficient to meet the country's entire demand.

OVERSEAS

Source of Fluorine Chemicals

Demand for fluorite, particularly from the steel industry, has encouraged the re-opening of the Chavagnac-Lafayette seams and there is talk of exploiting the Saint-Laurent-les-Bains seam. Exports to the U.S.A. are visualised.

Oil in Alsace

Exploratory work carried out by the Pechelbronn Company in the area of Soultz-sous-Forêts is reported to have resulted in the discovery of oil at a depth of 863 metres. In the initial stage of exploitation, a daily output of 500 metric tons is expected. This is the second oil well sunk in Alsace since the liberation.

Reported Uranium Finds

A Western Australian prospector claims to have found Australia's richest uranium deposit 85 miles from Marble Bar, North-Western Australia. Uranium ore is also reported to have been found in Honduras, and samples have been sent to the United States Atomic Energy Commission.

Iran's Own Oil Project

The Iranian Cabinet is reported to have approved the formation of an Iranian oil company which is to explore and exploit areas outside the Anglo-Iranian Oil Company's concession. The initial capital of this new company is expected to be about £1.1 million.

Isotopic Tracers

Nearly 600 shipments of radiotactive isotopes for use in scientific, agricultural, medical and industrial research have been sent to 21 countries, including Great Britain, the United States Atomic Energy Commission announced last week. More than 7500 consignments have been sent in three years to American and overseas laboratories.

Dow Chemical Sales

The view that the chemical industry generally should feel price reversals less strongly than some other industries, because it had raised prices only moderately during the period of inflation, was expressed by Mr. Leland I. Doan, president of the Dow Chemical Co., in the firm's 52nd annual report, issued recently. The need for product and methods improvement throughout many industries should help to maintain chemical markets, he suggested. Dow's sales were valued at $200 million, against $171 million in the previous year.

S. Rhodesian Magnesite

Deposits of magnesite recently discovered accidentally near Beit Bridge, Southern Rhodesia, are believed to be among the most extensive in South Africa, and second only to those in the Barberton district of the Transvaal.

Aid for French Potash

The Economic Co-operation Administration has given approval of a project to expand and modernise the potash mines owned and operated by Mines Demaniales de Potasses d'Alsace, Mulhouse, France. The project will require an ECA contribution equivalent to £1 million and French francs to the value of about £30 million.

New Australian Oil Refinery

A new £1 million oil refinery was opened last week by the Vacuum Oil Company at Paisley, eight miles from Melbourne. The works covers some 60 acres, and an adjoining 140 acres has been bought with a view to expansion when machinery is available.

French Chemicals in 1948

French sulphuric acid production in 1948 totalled 1,275,000 tons against 1,139,000 tons in 1938. Chloride produced amounted to 66,500 tons compared with 47,000 tons in 1938, and nitrogen to 176,000 tons (200,000 tons in 1938). The Kuhlmann factories in 1948 produced 620,881 tons of insecticides and fertilisers.

Australian Coalfield Development

An American offer involving the investment of £stg.6.25 million has been made for development of the Blair Atholl coalfield in Central Queensland, states a Reuter report. The deposits here have been estimated at not less than 200 million tons, and it was announced last year that at least £stg.9.6 million would be spent on the development scheme, in which two British concerns are interested.

Rising German Activity

Exports of pharmaceutical products from Western Germany continue to increase. For the first quarter of 1949 they amounted to 4.25 million Dm. against 1.21 million in the same period in 1948. This is still only 10 per cent of the pre-war turnover. Preparations are being made for the production of perlon (the German form of nylon) in Western Germany and large-scale production at Bobigen (formerly I.G.) will start at the beginning of 1950.

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgage Satisfaction

CHROMOCINE LTD. (M.S., 13/8/49). (formerly Chemical Development Co., Ltd.), London, W., dealers in chemicals, etc. Satisfaction July 12, of mortgage registered August 31, 1945.

Company News

The A.P.V. Company, Ltd.

The 39th ordinary general meeting showed that the group had maintained a strong financial position in the year ended December 31, 1948. Current assets £2,158,491 exceeded current liabilities by £789,904. Fixed assets and investments in subsidiary and associated companies were £311,722, and issued capital, reserves and accumulated profits £1,000,626. Dividend on ordinary shares remained unchanged at 50 per cent.

Benn Brothers, Ltd.

The directors recommend the payment of the following final dividends, less tax, for the year ended June 30: three per cent on preference shares, making 6 per cent for the year; 20 per cent on ordinary shares, making 25 per cent for the year (same); 5s. per share on the deferred shares (same).

Fricker's Metal and Chemical Co., Ltd.

Net profit for 1948 after full provision for taxation, £14,000 for depreciation, and £3000 for deferred repairs, was £90,009. After transferring £75,000 to general reserve and crediting £4349 brought in, available profit is £19,358 (£17,011). Directors recommend dividend of 10 per cent, and bonus of 5 per cent (both same) on ordinary shares.

New Registrations

Chemia Products (U.K.), Ltd.

Private company. (471,579). Capital £5000. Manufacturers and refiners of chemicals of all kinds. Directors: J. Lowe and C. H. Warbey. Solicitors: Kaufman & Maurice Abrahams, 72 New Cavendish Street, W.1.

Fillod Sales, Ltd.

Private company. (471,496). Capital £5500. Objects: To acquire from F. L. Crilly the benefit and obligations under an agreement with Fillod Developments, Ltd., relating to sales of that company's products; to acquire patents and inventions; to act as advisers; to deal in metals, plastics and synthetics of all chemical groups, textile and other materials, etc. Directors: F. L. Crilly; S. Thorne, 2 Flambard Road, Harrow, Middlesex.

Sinbor Products, Ltd.

Private company. (471,393). Capital £5000. Manufacturers of colloidal sols and gels and mixtures of natural or synthetic elastomers both organic and inorganic, in coated materials, artificial leathers, paints. Directors: S. P. Haycock, H. H. Haycock. Secretary: H. H. Haycock. Reg. office: 34 Glenburn Road, Kingswood, Bristol.

Walker Davis & Co., Ltd.

Private company. (471,543). Capital £1000. Manufacturing, analytical and consulting chemists. Solicitors: Reynolds Gorst & Porter, 7 Arundel Street, W.C.2.

Increases of Capital

The following increases have been announced: YORKSHIRE DYEWARE AND CHEMICAL CO., LTD., from £250,000 to £800,000. Industrial & Scientific Instruments Ltd., from £1000 to £10,000.

Changes of Name

The following changes in name have been announced: MIDLAND OIL CO., LTD., 85 Clifford Street, Lozells, Birmingham, 19, to MIDLAND PAINT & OIL CO., LTD.; ADHESIVE & ALLIED PRODUCTS, LTD., 11 Upper Grosvenor Street, W.1, to B. & B.I. (GROSVENOR), LTD.

Control Revoked

The Minister of Food has revoked the Manufactured and Prepacked Foods (Control) Order, 1942 as from August 7, from which date no licences will be needed for the manufacture and/or prepacking of, among a long list of products, the following: Essences, extracts (meat, yeast and vegetable), flavourings, food colourings, gelatine and gelatine products, salt, vinegars (including artificial vinegar).

The Stock and Chemical Markets

DESPITE a small, late recovery, another heavy fall in British Funds dominated stock markets this week. The volume of business remained restricted, and small selling had an exaggerated effect in some sections owing to the absence of demand. Long-dated stocks, particularly 2½ per cent Consols and Treasury Bonds and the nationalisation issues, were governed by a further sharp fall in 3½ per cent War Loan, which at one time was only slightly above the low level of 93¼ reached by this stock in 1940. Gas 3 per cent was affected by news of the further issue of this stock as compensation. Compared with initial dealings in gas stock at over par, the current price is only 89¼.

Chemical and allied shares have been fairly steady conforming with the prevailing trend in industrials, but the volume of business was so small that, except for the well known and widely held shares, quotations were not tested by dealings.

One view is that markets are likely to remain in a state of suspense until next month, when the outcome of the Washington talks should clarify the position. The downward trend of exports to the U.S. has probably not yet been checked.

Imperial Chemical moved back sharply to 41s. 7½d., following a little selling. Monsanto eased to 50s., Laporte Chemicals 5s. ordinary have been at 21s., Fisons 44s., Brotherton 10s. shares 20s., Albright & Wilson 27s. 9d., and Amber Chemical 2s. shares 4s. 4½d. Blythe Colour were 35s. 7½d., and Boake Roberts 28s. 6d. Elsewhere, British Glues & Chemicals have been steady at 18s. 6d., and General Refractories 23s. 1½d. There was buying of Lever N.V. up to 44s. 4½d., although the shares of Lever & Unilever, the English company, were little changed at 42s. 6d. Lever N.V. is among shares being favoured as a "hedge" against the possibility of currency devaluation. Dollar stocks, such as International Nickel, also attracted more attention for a similar reason. Shares of companies regarded as big dollar earners were favoured, including United Molasses, which changed hands around 38s., and Turner & Newall (74s. 6d.), but the 4s. units of the Distillers Co. eased to 24s. 9d. Borax Consolidated remained at 50s.

Iron and steel shares have been firmer, helped by the record steel output figures. Guest Keen were favoured and higher at 57s. 6d., while United Steel firmed up to 26s. 6d. In other directions Babcock & Wilcox rallied to 57s., with the new shares at a premium of 9d., after opening at a discount of 1s.

Boots Drug were firmer at 48s. 6d.; Glaxo Laboratories changed hands around £18, while British Drug Houses 5s. shares were around 7s. Among shares of companies connected with plastics, De la Rue were 27s. 3d., and British Xylonite 65s. 7½d.

Market Reports

ACTIVITY in most sections of the London chemical market is affected by the seasonal easing in demand and new business continues to be on a reduced scale. The soda compounds, generally, are in good call and caustic soda, bicarbonate of soda and chlorate of soda are all receiving attention. Bleaching powder, formaldehyde, hydrogen peroxide and acetone are other items in steady request. A slight increase in demand is being experienced for fertiliser materials. Quiet conditions persist on the coal tar products market, home quotations remaining unchanged.

MANCHESTER.—Fairly brisk trading conditions have been reported on the Manchester chemical market during the past week and holiday interference with business has been less marked than it was in the two previous weeks. Substantial quantities of textile chemicals are being taken up by the Lancashire cotton and allied trades, and other leading industrial users appear to have been active. Prices show little change on balance for the week, although uncertainty continues regarding some of the non-ferrous metal products. Most sections of the tar products market are quiet and some easing of prices seems to be expected.

GLASGOW.—Conditions have been a little more active in the Scottish heavy chemical market during the past week, although turnover is not yet back to normal after the holidays. No particular demands have been noted apart from the seasonal increases in the use of farmaldehyde and potassium nitrate.

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* "*Journal of Soc. of Chem. Industry.*" *Vol. 66, No. 5. pp. 138/139.*

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Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Methods and apparatus for measuring and controlling a moving column of plastic material.—E. A. Hawk. Nov. 4, 1946. 624,017.

Manufacture of polyazo dyestuffs.—J. R. Geigy Akt.-Ges. Nov. 9, 1945. 624,018.

Preparation of polysiloxane resins.—British Thomson-Houston Co., Ltd. Nov. 21, 1945. 624,019.

Polysiloxane resins.—British Thomson-Houston Co., Ltd. Nov. 21, 1945. 624,020.

Process for the production of zirconium and hafnium compounds.—C. E. Every (Titanium Manufacturing Co.). Dec. 17, 1946. 624,120.

Reagent for testing for acetone.—Denver Chemical Manufacturing Co. Dec. 24, 1941. 623,821.

Organic compounds. — Ilford, Ltd., H. D. Edwards and J. D. Kendall. Jan. 9, 1947. 624,028.

Continuous crystallisation. — Imperial Chemical Industries, Ltd. June 21, 1946. 624,125.

Apparatus for dispensing gases.—Linde Air Products Co. Jan. 31, 1946. 624,128.

Gas purifiers.—H. Singleton. Jan. 30, 1947. 623,823.

Process for the manufacture of pentaenes.—Roche Products, Ltd. (F. Hoffman-La Roche & Co., Akt.-Ges.). Feb. 20, 1947. (Addition to 605,208.) 623,826.

Catalysts.—Imperial Chemical Industries, Ltd., P. W. Reynolds and J. A. Mackenzie. Feb. 26, 1947. 624,035.

Process for stabilising dichlorodiphenyltrichloroethane.—Imperial Chemical Industries, Ltd., and A. Lamble. March 20, 1947. 624,136.

Process for the manufacture of unsaturated halogen compounds and products of dehalogenation thereof.—Ciba, Ltd. April 30, 1946. 624,047.

Manufacture of terephthalic acid.—I.C.I., Ltd., C. H. Bowden, G. M. Henderson, and S. R. Robinson. May 9, 1947. 623,836.

Production of hydrogenation derivatives of dypnone.—A. Boake Roberts & Co., Ltd., and E. J. Lush. May 15, 1947. 623,838.

Stilbene derivatives for use in whitening textile materials.—I.C.I., Ltd., D. A. W. Adams, and R. H. Wilson. May 19, 1947. 624,051, 623, 849, 624,052.

Carbonisation of carbonaceous materials.—Standard Oil Development Co. Oct. 26, 1946. 623,899.

Apparatus for treating with liquids samples of textile materials.—I.C.I., Ltd., and E. Marney. May 27, 1947. 624,054.

Apparatus for producing a suspension of liquid in a gas.—Andre (Components), Ltd., and V. A. Trier. June 4, 1947. 623,955.

Atomiser for discharging material in a molten state.—N. V. Enkes. Feb. 21, 1942. 624,066.

Method for desulphurising iron and steel with molten calcium carbide.—Air Reduction Co., Inc. Dec. 8, 1943. 623,966.

Method of treating sheets of ferrous silicon magnetic material to produce an electrically insulating film on the surfaces of the sheet.—Westinghouse Electric International Co. July 24, 1941. 623,892.

Liquid or gas measuring and dispensing apparatus.—S.A.T.A.M. Soc. Anon. Pour Tous Appareillages Mecaniques. Aug. 19, 1941, 624,454.

Production of magnesium base alloys.—Magnesium Elektron, Ltd., C. J. P. Ball, F. A. Fox, A. C. Jessup, P. A. Fisher, and A. L. Hock. March 12, 1945. 624,304.

Methods for producing penicillin.—A. J. Moyer. April 8, 1944. 624,411.

Process of separating fatty acids.—A. H. Stevens. (Emery Industries, Inc.). Sept. 5, 1945. 624,415.

Vulcanised poly furfuryl products.—J. B. Pierce Foundation. Jan. 13, 1945. 624,312.

Organo-silicon compounds.—Westinghouse Electric International Co. March 9, 1945. 624,361.

Organo-silicon compounds.—G. R. Shepherd. (Westinghouse Electric International Co.). March 8, 1946. 624,362, 624,363.

Method of isomerising butane.—Compagnie Française de Raffinage. July 17, 1945. 624,367.

Supporting disc for mounting textile fibre cakes in a column with a view to their treatment by wet process under pressure.—J. Annicq. Aug. 16, 1946. 624,441.

Apparatus for igniting a combustible gaseous mixture immersed in a liquid.—W. B. Smits. Nov. 1, 1945. 624,376.

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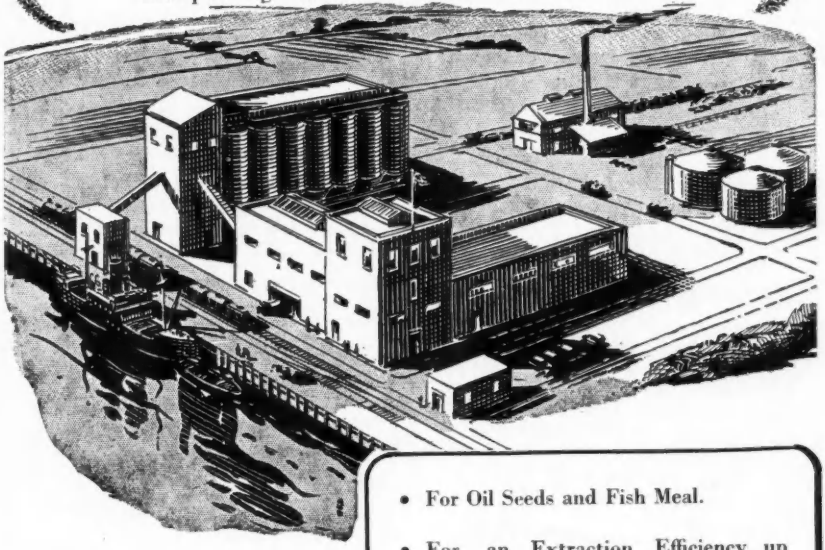

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Analytical Chemistry Congress

A REPRESENTATIVE gathering of chemists and others interested in the modern developments of analytical chemistry has met, under the chairmanship of Sir Robert Robinson, to consider the desirability of holding in Great Britain an international congress on the subject. A general committee and an executive committee have been formed to proceed with the organisation of this, which is planned for the summer of 1952.

A grant towards the preliminary expenses has been made by the Society of Public Analysts and Other Analytical Chemists, and it is hoped to have the support of the many other bodies to whom the development of analytical chemistry is vital. The honorary secretary of the proposed congress is Mr. R. C. Chirnside, research laboratories of The General Electric Co., Ltd., Wembley, Middlesex.

BWRA Number Changed

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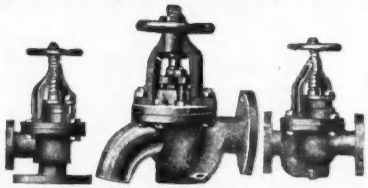

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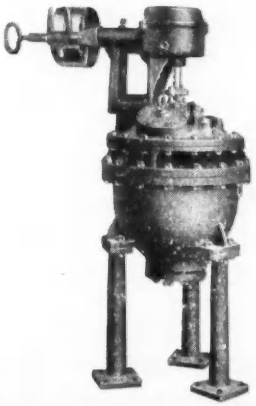

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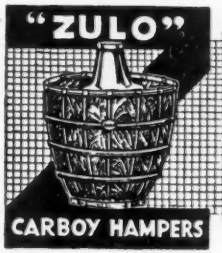

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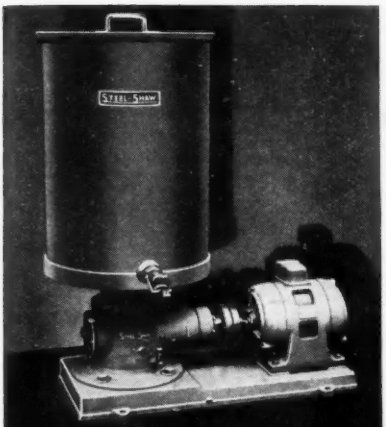

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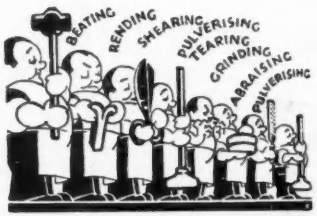

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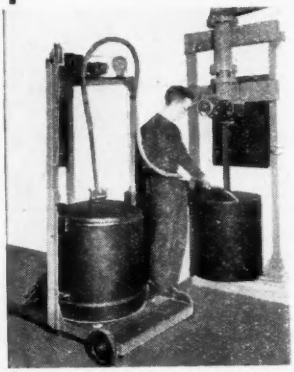

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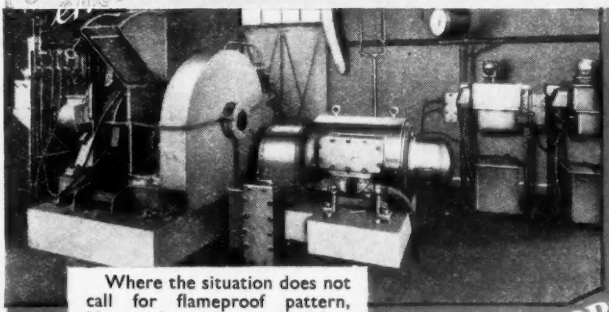

Left: A Metrovick 40 hp. flameproof motor driving Banbury mixer at a large paint works in the Midlands. The control gear is also of the Metrovick flameproof pattern.

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